FACTORS AFFECTING THE OPTIMAL USE OF IMAGERY AND SELF-TALK IN GOLFERS

FRANCES JANE LONGSTAFF

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Abstract

Imagery and self-talk are functionally similar and theoretically connected psychological strategies. In accordance with the multi-strategy approach to psychological skills training, there have been suggestions that athletes should use imagery and self-talk in conjunction (Hardy, Gammage, & Hall, 2001a). Although intuitively appealing, these recommendations are premature due to the evidence suggesting that situational demands, functional requirements and individual differences may influence athlete preferences for usage. This thesis aimed to address this ambiguity and identify the factors influencing the use and effectiveness of imagery and self-talk in golfers. The first three studies used a variety of methodologies including surveys, interviews and focus groups to profile existing practice and determine the predominant factors affecting usage. The final study examined the performance effects associated with the use of an imagery and self-talk intervention, that had been created based on the profiled information.

Study one determined the impact that individual differences in golfers' preferred cognitive styles had on their use of imagery and self-talk in practice and competition. Results revealed that golfers' preferred cognitive styles did not influence the formation of preferences for the use of one strategy rather than the other. Instead, all golfers reported using both strategies equally, although their use was reported more widely in competition than practice. Whilst study one ruled out preferred cognitive style as a determinant of golfers' preferences for the use of imagery and self-talk, it did not clarify how and why the two intervention strategies were used independently and in combination. The purpose of study two was therefore to identify how golfers used imagery and self-talk in combination and separately, considering the influence of contextual factors and functional requirements. Findings indicated that rather than employing the use of the strategies continuously throughout competition, golfers emphasised their use prior to the execution of particular golf strokes in specific conditions.

Study three identified the common characteristics of the competitive situations where golfers employed the use of imagery and self-talk. Findings revealed that golfers emphasised, and actively used, imagery and self-talk most when playing golf strokes under stressful competitive conditions. As a result of this finding, the next phase of study three examined how golfers used imagery and self-talk as problem and emotion focussed coping strategies when playing golf strokes under stressful competitive conditions. Results indicated that golfers predominantly used imagery and self-talk as problem focussed coping strategies, making more use of imagery than self-talk.

The purpose of the fourth study was to examine the effectiveness of using imagery in isolation, and in combination with self-talk, as a problem focussed coping strategy when dealing with golf strokes under stressful conditions in competitive situations. Findings revealed that golfers perceived their execution of golf strokes under stressful conditions to be most effective when imagery and self-talk were used in combination. However, this perceived advantage did not translate into identifiable performance gains during the monitored competitive rounds. Although the inherent variability of golf performance might have made it difficult to determine noticeable changes in performance, it was suggested that the lack of effects observed may have been due to the fact that imagery and self-talk as problem focussed coping strategies were simply ineffective.

Findings taken together revealed that contextual factors are the most influential determinant of golfers' use of imagery and self-talk. Furthermore, golfers emphasise the use of imagery and self-talk most when they need to perform golf strokes under stressful conditions, applying their use as problem focussed coping strategies. However, results from the final study appeared to suggest that this approach to the use of imagery and self-talk might be ineffective.

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Table of Abbreviations

CS	Cognitive Specific imagery
CG	Cognitive General imagery
MS	Motivational Specific imagery
MGM	Motivational General Mastery imagery
MGA	Motivational General Arousal imagery
SOP	Style Of Processing Questionnaire
TOPS	Test Of Performance Strategies questionnaire
SD	Standard Deviation
PMR	Progressive Muscular Relaxation
MIQ-R	Movement Imagery Questionnaire-Revised
ICC	Intraclass correlation coefficient

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Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work

Name:

Signature:

Date:

1. Introduction

1.1 Introduction

Golf is a hugely popular sport with an estimated 60 million players and 30,000 golf courses across the world at the start of the 21st century (Farrally, Cochran, Crews Hudzan, Price, Snow *et al*., 2003; Readman, 2003). In 2008 in the United Kingdom alone there were 4.3 million golf course users with 11% of 25 – 34 year olds playing the sport (Sports Marketing Survey, 2008). Golf generates a huge amount of revenue in the United Kingdom and Ireland with average annual club fees costing approximately £724 in 2007 (KPMG, 2008). Furthermore, golf was watched by 31.3 million United Kingdom residents in 2008 making it the country's fourth most televised sports event (Sports Marketing Surveys, 2008).

It has been proposed that physiological factors play a less important role in golf performance than other sports (Baker, Horton, Pearce, & Deakin, 2005) and that instead, psychological factors are the predominant determinant of golfing performance (Rotella & Boutcher, 1990). More specifically, research reveals that golfers report that automaticity, high self-confidence, focus, limited negative thoughts, an ability to cope with pressure and 'stay in the moment' and an enjoyment for achieving goals are all variables associated with peak golfing performance (Cohn, 1991; Hellström, 2009; McCaffrey & Orlick, 1989; Thomas & Over, 1994).

Despite the importance that golfers place on psychological factors, achieving the optimum mental state for golf is not straightforward. In contrast to other sports, golfers have an excessive amount of 'thinking time' available to them during competition, which can lead to the occurrence of disruptive thoughts (Kirschenbaum, Owens, & O'Connor, 1998; Nicholls, Holt, Polman, & James, 2005a; Pates, Oliver, & Maynard, 2001). For this reason it is common for players to employ the use of psychological strategies as a means of optimising mental states (Bois, Sarrazin, Southon, & Boiche, 2009; Giacobbi, Foore, & Weinberg, 2005; Nicholls *et al.*, 2005a).

Four of the most effective and commonly employed psychological strategies for exerting control over, and optimising, different psychological states in sport are imagery, self-talk, goal setting and relaxation (Hardy, Jones, & Gould, 1996; Thelwell & Greenlees, 2001). Imagery (Holmes & Collins, 2001; Short, Bruggeman, Engel Marback, Wang, Willadsen *et al*., 2002) and self-talk (Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000; Zervas, Stavrou, & Psychountaki, 2007; Zinsser, Bunker, & Williams 2010) in particular, are recognised as two of the most popular and effective psychological strategies amongst sport psychologists, coaches and athletes. Both imagery and self-talk are documented as fundamental cognitive strategies (Thomas & Fogarty, 1997).

Although imagery and self-talk are distinct and have been found to be effective when used independently of one another, in accordance with the current multi-strategy approach to psychological skills training, it has been proposed that the strategies may be more effective when employed in conjunction (Cumming, Nordin, Horton, & Reynolds, 2006; Hall, Moore, Annett, & Rodgers, 1997; Hardy *et al*., 2001a). The underpinning rationale for this proposal stems from the functional commonality (Hardy *et al.*, 2001a) and theoretical connections between the two strategies (Annett, 1996; Paivio, 1971; 1986).

When used independently both imagery and self-talk can be used to facilitate the learning and execution of skills and strategies (Driskell, Copper, & Moran, 1994; Feltz & Landers, 1983; Hardy *et al*, 2001a; Hardy *et al.*, 2005a; Landin, & Herbert, 1999; Munroe, Giacobbi, Hall, & Weinberg, 2000; Nordin & Cumming, 2005a; Ziegler, 1987), enhance mastery (Abma, Fry, Li et al., 2002; Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009; Hardy *et al.*, 2001a; Moritz, Martin, Hall, & Vadocz, 1996; Munroe *et al.*, 2000) and motivation (Gammage, Hardy, & Hall, 2001; Munroe *et al.*, 2000) and regulate arousal/anxiety (Hatzigeorgiadis *et al.*, 2007; Hatzigeorgiadis, *et al.*, 2009; Munroe *et al.*, 2000; Nordin & Cumming, 2005a; White & Hardy, 1998). Consequently, these similarities have led to suggestions that there may be additive effects associated with the use of the strategies together in serving the same functions (Hardy *et al.*, 2001a).

Along with these functional similarities, theoretical models of learning (Annett, 1996; Bandura, 1986) and processing (Paivio, 1971; 1986) suggest that imagery and self-talk are intrinsically linked to one another. According to Annett (1996) and Paivio (1986), when people learn and process information they do so in either visual and/or verbal channels and whilst these channels can function independently of each other, the use of one channel can naturally invoke the use of the other. Consequently, it has been suggested that the use of imagery and self-talk together may be more effective than when they are used independently (Hall *et al.*, 1997).

Despite these intuitively appealing suggestions only two studies to date have examined the performance effects associated with the combined use of imagery and self-talk (Cumming *et al.*, 2006; Hall *et al.*, 1997). Although both were found to be supportive of the use of imagery and self-talk together, there remains limited evidence for conclusive recommendations for their combined use to be formulated. Furthermore, there are suggestions that individual differences in preferred cognitive style may result in athletes displaying preferences for the use of one strategy over the other (Martin, Moritz, & Hall, 1999; Hardy, *et al.*, 2005a; Hardy, Oliver, & Tod, 2010). Preferred cognitive style refers to individual preferences for processing information in either visual or verbal modes.

Whilst preferred cognitive style might serve in providing opposition to the combined use of imagery and self-talk, there are several other factors that also warrant consideration. Firstly, there is limited understanding regarding how imagery and self-talk are best used independently of each other. For example, although it widely accepted that imagery and self-talk effectiveness is dependent on the creation of vivid and controlled images (Holmes & Collins, 2001; Vealey & Greenleaf, 2010) and the use of short self-talk statements (Zinnser *et al.*, 2010) respectively, there is much conflict regarding the way in which the strategies should be used to serve both cognitive and motivational functions. Early proposals recommended that the functions of imagery (Hall, Mack, Paivio, & Hausenblas, 1998; Paivio, 1985) and self-talk (Zinsser, Bunker, & Williams, 2006) were determined by the use of specific content. Although these suggestions were intuitively appealing, it has subsequently been argued that there may be considerable variation in the content of imagery (Short, Monsma, & Short, 2004; Nordin & Cumming, 2005a) and self-talk (Hardy, 2006; Hardy *et al*., 2010) when used to serve cognitive and motivational functions.

Along with the limited understanding regarding the ‘best use’ of imagery and self-talk independently, there is also evidence to suggest that functional requirements and contextual factors may result in further preferences for the use of one strategy over the other being formulated. For example, research has revealed that self-talk is more effective in reducing anxiety than imagery as it tackles directly the negative verbalisations that characterise worry (Fletcher & Hanton, 2001). Moreover, previous studies, across a variety of sports, have found that athletes use imagery and self-talk at different time points, with imagery typically being employed more as a pre-competitive strategy (Hall, Rodgers, & Barr, 1990; Weinberg, Butt, & Knight, 2003) and self-talk as a strategy for use during competition (Hardy *et al.*, 2001a; Hardy *et al.*, 2005a). Consequently, it has been suggested that self-talk may lend itself better to time restricted situations than imagery, as it is quicker and more effortless (Hardy *et al.*, 2005a). These considerations demonstrate that it may not always be possible, or appropriate, to use imagery and self-talk together.

The research profiled presents imagery and self-talk as popular applied psychological strategies in sport. However, it is clear that there is still limited understanding regarding the 'best use' of the strategies independently and in combination. Consequently, the purpose of this programme of research was to determine the factors influencing the use, and effectiveness, of imagery and self-talk. Due to reports that golf performance is highly dependent on psychological variables (Cohn, 1991; McCaffrey & Orlick, 1989; Rotella & Boutcher, 1990; Thomas & Over, 1994), these factors were examined in golf specifically. This sport specific approach to the study of imagery and self-talk is in line with current recommendations for sport psychology (Dosil, 2006). Moreover, existing research has found sport type to be an influential determinant of imagery (Arvinen-Barrow, Weigand, Thomas, Hemmings, & Walley, 2007; Hall *et al.*, 1990; Weinberg *et al.*, 2003) and self-talk use (Hardy *et al.*, 2004; Hardy *et al.*, 2005a).

Four studies were undertaken to address the aims of the programme of research. The first three studies profiled the key factors influencing golfers' use of imagery and self-talk to inform the development of an intervention. The final study ascertained the performance effects associated with the use of an imagery and self-talk intervention which had been designed based on findings from the preceding studies. Consequently, the purpose of this thesis was to:

- Review the extant literature on the factors influencing the independent and combined use of imagery and self-talk. Particular attention was paid to the role that functional requirements, processing mechanisms and contextual factors have been found to play in the use of the strategies. Additionally, existing research on the factors affecting the use of imagery and self-talk in golf specifically was appraised.
- Identify how preferred cognitive style impacted upon golfers' use of imagery and self-talk in practice and competition.

- Determine how imagery and self-talk were used in combination and isolation in golf.
- Identify the common characteristics of the competitive situations where golfers emphasised the use of imagery and self-talk.
- Determine how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediately prior to the execution of, golf strokes under stressful conditions.
- Ascertain the effectiveness of a problem focussed imagery and self-talk package on the execution of golf strokes under stressful competitive conditions.

2. Review of literature

2.1 Review of literature

The purpose of this review of literature, which is presented in six distinct sections, is to look at the independent use of imagery and self-talk as a prequel to appraising the factors pertinent to the combined use of the strategies. The first short section will provide definitions of both imagery and self-talk as psychological strategies. The second section will critique the functional commonality between imagery and self-talk as this provides one of the most convincing cases for the combined use of the strategies (Hardy *et al.*, 2001a). The third section will detail the potential impact that contextual factors may have upon the use of imagery and self-talk, whilst the fourth section will outline the mechanistic connections between the two strategies. The fifth section will present an overview of the extant research on imagery and self-talk in golf specifically, and the sixth section will provide some concluding comments on the existing knowledge base, and will reiterate the aims of this thesis.

Each section will ultimately serve in presenting the ambiguity in the literature regarding the recommendations for the combined use of imagery and self-talk. Furthermore, relevant imagery and self-talk theories will be discussed within each section to explain how the strategies work, and how preferences for their combined and independent use may be formed.

2.2 Definitions of imagery and self-talk

Before profiling the literature on the factors affecting the use of imagery and self-talk, it is important to provide definitions of the strategies. Research into imagery as a performance enhancement strategy dates back over decades (Driskell *et al*., 1994; Feltz & Landers, 1983; Jacobson, 1931; Sackett, 1934). Early definitions of imagery simply referred to it as the rehearsal of tasks without physically engaging in them (Driskell *et al.*, 1994; Feltz & Landers, 1983). Although these definitions were concordant with what the researchers were examining at the time (comparing the effects of mental and physical practice on the performance of simple motor tasks), they are limited by their simplicity. Such definitions failed to acknowledge the multidimensional nature of imagery or the fact that images can be emotive or wider and more encompassing than the production of just one skill. This is an important limitation given that people have widely reported: the use of emotive imagery (Hall *et al.*, 1998), the imagination of a wider range of situations than just the performance of motor skills (Hall *et al.*, 1998; Munroe *et al.*, 2000) and have alluded to the use of a variety of different senses when using imagery (Munroe *et al.*, 2000). In order to overcome some of the limitations associated with the previous motor performance orientated definitions, imagery in sport can be more appropriately defined as "the creation or re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under volitional control of the imager, and which occur in the absence of the real stimulus antecedents normally associated with the actual experience" (Morris, Spittle, & Watt, 2005, p.19).

Like imagery, self-talk is a hugely popular cognitive strategy (Theodorakis *et al.*, 2000; Zinsser *et al.*, 2010). Many sport psychologists, athletes and coaches use or recommend the use of self-talk to facilitate sports performance (Zervas *et al.*, 2007). Research into self-talk use, and its effectiveness, within sport settings has mirrored much of what has been examined in the field of imagery (Gammage *et al*., 2001; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a; Hatzigeorgiadis *et al*., 2007). It is widely acknowledged that self-talk is an effective psychological strategy for sport performance (Landin & Herbert, 1999; Theodorakis *et al.*, 2000; Zeigler, 1987). However, research into self-talk is still largely in its infancy (Hardy *et al.*, 2005a; Thomas, Murphy, & Hardy, 1999) with limited theoretical underpinning (Hardy, 2006) in comparison, and there is scope for further development.

Self-talk is not easily defined and Hardy (2006) directed criticism towards some of the definitions provided thus far, arguing that they were not specific enough and did not capture its multidimensional nature. To combat these previous inadequacies, Hardy provided some guidelines for definitions of self-talk stating that they should include the following elements "a) verbalisations or statements addressed to the self, b) multidimensional in nature, c) having interpretive elements associated with the content of the statements employed, d) is somewhat dynamic and e) serving at least two functions; instructional and motivational, for the athlete (p. 84)."

2.3 Functional commonality

The functional commonality between imagery and self-talk provides one of the most persuasive cases for the combined use of the strategies (Hardy *et al.*, 2001a). When examined independently of each other, research has revealed that both imagery (Callow, Hardy, & Hall, 2001; Driskell *et al.*, 1994; Feltz & Landers, 1983; Mellalieu, Hanton, & Thomas, 2009; Martin *et al.*, 1999; Munroe *et al.*, 2000) and self-talk (Landin & Herbert, 1999; Ming & Martin, 1996; Ziegler, 1987; Hardy, 2006; Hardy *et al.*, 2001a;

Hatzigeorgiadis *et al*., 2007) can be used to facilitate the learning and execution of skills and strategies, increase confidence and motivation, and control anxiety. Although these functional commonalities have led to calls for the combined use of imagery and self-talk (Hardy *et al*., 2001a), there are a number of inconsistencies regarding how the strategies are 'best' used independently of each other which make these recommendations difficult to formulate. Additionally, whilst the functions served by imagery (Martin *et al*., 1999) and self-talk (Hardy *et al*., 2010) are often discussed as outcomes (e.g., whether an athlete has become more confident or performed a skill better), there is initial evidence to suggest that functional requirements themselves can result in athlete preferences for the use of one strategy over the other (Fletcher & Hanton, 2001). This once again demonstrates that recommendations for the combined use of imagery and self-talk may be premature. Consequently, the purpose of the following section of this review is to appraise the functional commonality between imagery and self-talk and discuss any factors that may impact upon recommendations for their combined use.

Independently of one another, early recommendations for how both imagery (Paivio, 1985; Hall *et al*., 1985) and self-talk (Zinsser *et al*., 2006) worked in serving a range of functions, suggested that strategy content determined the functions that they served. Independently of self-talk, Paivio (1985) proposed a theoretical model for the functions that imagery served. Figure 2.1 outlines Paivio's theoretical model.

	Motivation	**Cognition**
General	Arousal & Affect	Strategies
Specific	Goal orientated	Skills

Figure 2.1 Functions served by imagery (Paivio, 1985, S.23)

Paivio (1985) suggested that imagery served four predominant functions, and that these functions were served through the use of concordant imagery types. More specifically, he argued that there were two types of imagery (cognitive and motivational) working at specific and general levels. Cognitive specific imagery (CS) was described as imagery that involved the imagination of the production of skills. As such, it was argued that this imagery type should be used to facilitate the production of specific skills. Cognitive general imagery (CG) was described as imagery that involved the imagination of strategies and tactics and as a result, it was argued that this imagery type should be used to develop strategies. Paivio (1985) recognised that there was extensive research supporting the use of CS imagery but acknowledged that there was no research supporting the use of CG imagery. He did, however, use an anecdotal example from tennis player Chris Evert Lloyd to highlight its existence. He explained that before tennis matches, she would imagine the match, anticipate what her opponents were going to do and as a consequence would formulate her own imagined game plan. This clearly demonstrated that cognitive imagery was more extensive than just the imagination of skills.

As well as outlining the cognitive types of imagery, Paivio (1985) presented the motivational specific and general types. He argued that motivational specific (MS) imagery involved the imagination of a goal and could be used to encourage and increase goal-orientated behaviour and motivation. Finally, he suggested that motivational general (MG) imagery could be used to help affect arousal and emotions. This involved the imagination of feeling certain emotions or being in certain psychological states.

The framework proposed by Paivio has influenced much of the sport imagery research undertaken over the course of the last decade, with it being widely argued that specific imagery types should be used to serve certain functions (Arvinen-Barrow *et al*., 2007; Hall *et al.*, 1998; Martin *et al.*, 1999; Munroe *et al.*, 2000). Early attempts were made to design a questionnaire that measured the different types of imagery (Salmon, Hall, & Haslam, 1994). However, Hall *et al.* (1998) developed the hugely popular Sport Imagery Questionnaire (SIQ). The SIQ was developed to assess athletes' use of the different imagery types and, consequently, the functions for which they were using them. Of particular relevance, however, was that the development of the questionnaire led to a realisation that there were, in fact, five different imagery types serving five distinct functions, rather than four. Motivational general imagery was found to represent two different general imagery components. Through the research conducted by Hall *et al*. (1998), motivational general imagery was divided into motivational general-mastery imagery (MG-M) and motivational general-arousal imagery (MG-A). MG-M imagery represented the imagination of mastery which included being focussed, confident, in control and mentally tough. MG-A imagery involved the imagination of being optimally aroused and in control of anxiety (Hall *et al.*, 1998). It was argued that MG-A imagery should be used to optimise arousal/anxiety and MG-M should be used to increase feelings of mastery (Hall *et al.*, 1998).

As with imagery, research into how self-talk worked in serving different functions adopted the same position, that self-talk content was a determinant of function (Hardy *et al*., 2010; Hatzigeorgiadis *et al.*, 2007; Zervas *et al.*, 2007). Like Hall *et al.* (1998), Hardy *et al.* (2001a) argued that self-talk could be used to serve the same five functions of imagery. These included the facilitation of the learning and execution of skills and strategies, and the optimisation of mastery (focus, self-confidence, mental readiness and an ability to cope with difficult circumstances), drive and arousal control. Theodorakis, Hatzigeorgiadis, and Chroni (2008) argued that these functions, or reasons why athletes used self-talk, could be further categorised as outcome or process functions. For example, skill and strategy development and execution were classified as outcome functions. However, arousal regulation, effort, focus, confidence and mental readiness elevation were all identified as process functions. Theodorakis *et al.* (2008) posited that the process functions were potential mechanistic determinants of the outcome functions. These suggestions were largely informed by the cognitive behaviour modification theory which suggests that verbalisations to the self dictate subsequent behaviour (Meichenbaum, 1977). Consequently, Theodorakis *et al*. (2008) argued that an understanding of the functions of self-talk was necessary to determine which self-talk types should be used to serve each function. This again suggested, as with imagery, that self-talk content was a determinant of the functions that it served.

Unlike imagery, however, early recommendations of the self-talk types used to serve different functions were much broader than the five imagery types proposed by Hall *et al.* (1998). More specifically, self-talk content was initially categorised as either instructional or motivational depending on its content (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004; Theodorakis *et al*., 2000). Instructional self-talk was defined as statements addressed to the self that trigger actions and direct attention (e.g., ‘reach, move left, drive the arms’). Motivational self-talk was identified as statements aimed at increasing confidence, arousal or motivation (e.g., ‘you can do this’; Theodorakis *et al.*, 2000).

It was proposed that motivational self-talk was most appropriate for optimising psychological outcomes such as confidence, arousal control and motivation, whilst instructional self-talk was more effective in focussing athlete attention and facilitating the learning and execution of skills (Zinsser *et al.*, 2006). Although this proposal is in its infancy, Chroni, Perkos, and Thoedorakis (2007) found partial support for it when they found that novice athletes perceived instructional self-talk to be more facilitative in improving technique than motivational self-talk, and motivational self-talk to be more effective in confidence, concentration and relaxation enhancement than instructional self-talk. Despite the apparent concordance between the use of certain self-talk types and the perceived functions served, objective measures were not recorded in this study. This made it difficult to determine if the strategies were actually fulfilling the functions that they were perceived as serving.

Additionally, findings from an earlier study provided less conclusive evidence for the content function proposal when students from a swimming class were asked to rate the perceived functions (assessed using the Functions of Self-Talk Questionnaire; FSTQ) of prescribed instructional ('stretch, relaxed') and motivational ('go, I can') self-talk cues (Hatzigeorgiadis, 2006). Results revealed that the only difference in the perceived functions of instructional and motivational self-talk was effort. More specifically, participants' use of motivational self-talk was perceived as serving greater effort enhancing functions than instructional self-talk. However, no differences were found between instructional and motivational self-talk in their perceived attention, confidence, anxiety control and automaticity functions. A potential explanation for the lack of differences in these constructs may be provided by examining more closely the self-talk cues prescribed. Upon inspecting the motivational self-talk cues prescribed it is apparent that these cues were predominantly orientated towards increasing motivation rather than controlling anxiety. As a result of these assessments it is possible that the classification of self-talk as being either instructional or motivational is overly simplistic. This may explain why differentiations in perceived functions were not gained in the study profiled.

As a consequence of the issues associated with the classification of self-talk as being either instructional or motivational, Hatzigeorgiadis *et al.* (2007) later examined the effect of more specific self-talk cues (attentional and arousal control self-talk) on perceived and actual functions served, and swimming performance. The perceived functions of self-talk were assessed using the FSTQ (Hatzigeorgiadis, 2006), whilst the actual functions served were measured through the use of a variety of questionnaire subscales. For example, attentional control was determined using the attentional control subscale of the Test of Performance Strategies (TOPS) questionnaire (Thomas, Murphy, & Hardy, 1999), whilst levels of confidence and anxiety were ascertained using the Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Vealey, Bump, & Smith, 1999). Results provided only partial support for the role of self-talk content in the functions served. Findings revealed that although anxiety control self-talk was perceived, and found, to control anxiety more than attentional self-talk, no significant differences were found in the attentional functions of these two types. Instead, both were found to serve this function most.

The functional commonality between imagery and self-talk, and the suggestion that specific contents should be used to serve specific functions, make it intuitively appealing to recommend the combined use of matched imagery and self-talk types for serving particular functions. However, caution must be applied when formulating these recommendations as to date there is limited research supporting the combined use of the strategies in this way (Cumming *et al.*, 2006; Hall *et al.*, 1997). Moreover, the suggestion that certain imagery (Short *et al*., 2004) and self-talk (Hardy, 2006; Hardy *et al*., 2010) types should be used to serve specific functions has been subject to criticism. Upon finding that facilitative forms of both CS and MG-M imagery types increased self-efficacy in a golf putting task, Short *et al.* (2002) argued that the functions of imagery could be served by a variety of imagery types. For example, CS imagery may not only be used to facilitate the execution of skills but may also be used to elevate self-confidence. Furthermore, MS imagery may be used to both increase motivation and confidence. As such, Short *et al.* (2004) argued that imagery content may be less important than was first believed and that, instead, it was more important to understand athletes' individual perceptions of the functions served by the imagery that they were using. This proposal was in accordance with the earlier theoretical work by Ahsen (1984) who argued that different people may perceive a range of individual meanings from their imagery.

In order to test the suggestion that the functions served by imagery could be fulfilled through the use of a range of different imagery contents, Short *et al.* (2004) recruited college athletes (N=275) from a variety of sports and asked them to complete a modified SIQ. Firstly, they were asked to rate how much they used CS, CG, MS, MG-M and MG-A imagery types on a modified version of the SIQ. The SIQ contained a total of 30 items, with six items forming a subscale for each imagery type. For each item participants were then asked to circle a further option to state the main reason why they used these imagery types from one of the following five options, "a) to help me learn and perform new skills, b) to help me learn and perform new strategies, c) to affect my motivation, d) to affect my confidence, e) to affect my arousal (p. 343)." Results revealed that athletes used MG-M imagery most and MS imagery least. Furthermore, it was found in the most part, that imagery type was matched to its 'correct' function although certain imagery types were also found to be multifunctional. For example, a CG imagery item was found to serve confidence and motivating functions rather than strategic functions and two of the MG-A imagery items were found to serve motivating functions rather than arousal/anxiety control functions. The authors argued that they may have found imagery to be even more multifunctional had the research design permitted participants to select more than one perceived function for each imagery type. This was a clear limitation in the design of the study which affected its ability to 'tease out' the multifunctional nature of the different imagery types. In addition, caution must be applied when coming to conclusions about the findings, as imagery use (as assessed on the SIQ) was scored on a 1-7 Likert scale, with respondents rating the amount that they used the different imagery types from 'rarely' to 'often'. An issue with this was that there was no option for athletes to answer 'never.' As such, athletes may have been reporting that they used an imagery type even if they were not. This could have led to the selection of a perceived function from the list provided, even though this was not particularly relevant to them. This may have affected the results, making it difficult to gain true insight into the functions that the different types of imagery serve.

Despite the methodological issues associated with the study profiled, additional support for the multifunctional nature of imagery has been found. For example, earlier research revealed that highly confident athletes reported the use of all five imagery types significantly more than less confident athletes (Abma *et al.*, 2002). As a consequence the authors suggested that a range of imagery contents were integral to confidence enhancement rather than just the expected MG-M imagery type. Additional research has also found that dancers report the use of a variety of different imagery types to serve the same functions (Nordin & Cumming, 2005a). Despite this it must be noted that although findings indicate the multifunctional nature of imagery, the performance effects associated with the use of different imagery types for serving the same functions is under researched. However, research has found a positive relationship between the frequency with which athletes use different types of imagery and their perceived effectiveness (Short, Monsma, & Short, 2007; Weinberg *et al*., 2003).

Although research into self-talk is in its infancy there have been similar suggestions that athletes may also make use of a range of self-talk contents to serve a variety of functions (Hardy, 2006; Hardy *et al*., 2010). Hatzigeorgiadis *et al.* (2007) found evidence to support this suggestion when they found that arousal control and attentional self-talk cues were both perceived as serving attentional functions. Consequently, as with imagery, it may be unwise to suggest that certain self-talk types should be used to serve certain functions.

The research profiled presents opposing evidence to the suggestion that specific imagery and self-talk contents should be used to serve particular functions. The following sections of the review will critique the functional commonality between imagery and self-talk, whilst acknowledging that there may be considerable variation in the contents used to serve these functions. It will serve in detailing the potential ways in which imagery and self-talk can be used together in serving the same functions, whilst drawing attention to the factors that may provide evidence against the use of the strategies in this way. The functions of both imagery (Hall *et al.*, 1998; Paivio, 1985) and self-talk (Hardy *et al.*, 2001a) can be broadly categorised as being either cognitive or motivational. When the strategies are used by athletes to facilitate the learning and execution of skills and strategies they are referred to as serving cognitive functions. However, when they are used to optimise different psychological constructs such as arousal, motivation and confidence, they are recognised as serving motivational functions.

2.3.1 Cognitive functions

2.3.1.1 Learning and executing skills

Athletes have reported the use of both imagery (Munroe *et al.*, 2000; Nordin & Cumming, 2005a; Short *et al.*, 2004; White & Hardy, 1998) and self-talk (Gammage *et al.*, 2001; Hardy *et al.*, 2001a) to facilitate the learning and execution of skills. When used independently of self-talk, athletes have been found to employ the use of imagery to learn, memorise, improve, plan (Nordin & Cumming, 2005a), acquire, rehearse, perfect, maintain, automate (White & Hardy, 1998), execute and correct (Munroe *et al.*, 2000) skills.

Cognitive specific (CS) imagery is the most commonly reported imagery type for facilitating the learning and execution of skills (Short *et al.*, 2004), although it has been found that dancers also make use of metaphorical, execution, body-related and context images to serve this function (Nordin & Cumming, 2005a). Examples of such images include; imagining falling into sand, and the vertebrae rotating as the spine moves into different positions.

Athlete reports of the use of imagery to facilitate the acquisition and execution of skills are supported by a plethora of experimental research. Much of the early experimental research into imagery compared its effect on the performance of simple motor tasks with physical practice. Findings frequently revealed that although imagery was no replacement for physical practice, it was better than doing nothing at all (Driskell *et al.*, 1994; Feltz & Landers, 1983).

As a consequence of the influential role that imagery has been found to play in the acquisition and execution of skills, a number of theories have been proposed to explain how the strategy works in serving this function (Holmes & Collins, 2001; Jacobson, 1931; Sackett, 1934). The psychoneuromuscular theory (Jacobson, 1931) was one of the first theories proposed, suggesting that imagery facilitated the learning and execution of skills through muscle memory strengthening. More specifically, this theory argued that the vivid imagination of a task could result in activity occurring, although to a lesser extent, in the same muscles that would be activated if the movement or task was to actually physically occur. Jacobson (1931) found initial support for his theory when he assessed ocular and bicep muscle activity under different imagined bicep curl conditions (no imagery, visual imagery and kinaesthetic imagery). Results revealed, with small numbers, that ocular muscle activity was higher during the visually imagined bicep curls, and that muscular bicep activity was higher during the kinaesthetically imagined bicep curls. Jacobson (1931) concluded that imagery was not an activity that occurred solely in the brain and suggested that there might be a neuromuscular mechanism.

Despite these early findings Slade, Landers, and Martin (2002) found less conclusive support for the psychoneuromuscular theory when they assessed electromyographic (EMG) activity in the biceps and triceps during real and imagined arm curling exercises using dumbbells. Results revealed that although there was activation in the muscles in the imagined condition it was not representative of what was observed during the real movements. Smith, Collins, and Holmes (2003) found a similar lack of agreement between imagined and actual muscle activation when they conducted a study comparing the effects of physical and mental practice on finger strength and EMG activity. The limited support for the psychoneuromuscular theory has led to suggestions that it is not a viable explanation for how imagery works in facilitating the learning of skills (Feltz & Landers, 1983).

Shortly after the proposal of the psychoneuromuscular theory, the symbolic learning theory (Sackett, 1934) was presented in opposition to explain how imagery worked in facilitating the learning and execution of skills. Instead of suggesting a neuromuscular mechanism, the symbolic learning theory proposed that imagery aided the acquisition of skills through the development of mental blueprints for tasks. Sackett (1934) found initial support for his theory when he found that mental practice successfully aided the retention of a maze task. This was supported by later research that found imagery to be more effective in facilitating cognitive tasks rather than motor tasks (Driskell *et al.*, 1994; Feltz & Landers, 1983). These findings appeared to suggest that imagery enhances cognitive processes rather than neuromuscular ones.

Although the symbolic learning theory has received support, the last decade has seen the development of the functional equivalence theory as a more thorough explanation for how imagery works in facilitating the learning and execution of skills (Holmes & Collins, 2001). The functional equivalence theory (Holmes & Collins, 2001) has drawn upon principles from both the psychoneuromuscular (Jacobson, 1931) and symbolic learning theories (Sackett, 1934), and suggests that imagery facilitates the acquisition and execution of skills through the replication of what happens at a central (brain), peripheral (muscles) and behavioural level when a movement or task is physically undertaken.

The development of the functional equivalence theory led Holmes and Collins (2001) to suggest that athletes' imagery use should replicate real life situations as closely as possible in order for the greatest performance effects to be experienced. As a result, they developed a seven item checklist (frequently referred to as PETTLEP) to ensure the creation of vivid images. They argued that the physical properties of the situation (positions, clothing, equipment etc.), environment, task (how you would think and feel), timing, stage of learning, emotions and visual perspective all need to represent real life as closely as possible in order to ensure a facilitation in the learning and execution of skills.

Over the course of the last ten years there has been a surge in research examining the functional equivalence theory in sport (Smith & Collins, 2004; Smith & Holmes, 2004; Smith, Wright, Allsopp, & Westhead, 2007; Smith, Wright, & Cantwell, 2008; Wright & Smith, 2007). Support for the theory, and the PETTLEP principles, has been resounding with findings from a recent study revealing that PETTLEP informed imagery training led to an increase in bunker shot performance similar to that experienced when physical practice was undertaken (Smith *et al.*, 2008). As a result, the functional equivalence theory is now the most widely accepted theory for explaining how imagery works in facilitating the learning and execution of skills.

Despite the wide support for the functional equivalence theory it has been suggested, particularly with skilled athlete populations, that imagery might work in facilitating the execution of skills by increasing their automaticity (Feltz & Landers, 1983). Field-based research has identified that expert dancers and slalom canoeists widely report the use of the strategy to memorise and automate their skills (Nordin & Cumming, 2005a; White & Hardy, 1998). Despite this, there is limited experimental support for the use of imagery in serving this function, although Thomas and Fogarty (1997) found that instructional and positive imagery and self-talk training led to greater perceptions of automaticity and improved performance in golf. Although this provides some initial evidence for the role of imagery in the elevation of automaticity, its individual contribution in serving this function was unknown as self-talk was also central to the intervention. As such, the functional equivalence theory still remains the most supported explanation for how imagery works in facilitating the learning and execution of skills.

As with imagery, early research into the functions of athlete self-talk focussed mainly on the role that it played in the learning and execution of skills. Results were found to be supportive of the use of the strategy in serving this function, across a range of sports and skill levels (Landin & Herbert, 1999; Ming & Martin, 1996; Ziegler, 1987). Although there is currently limited theoretical support for the way in which self-talk works in serving a variety of functions (Hardy, 2006), it has been proposed that the strategy enhances the learning and execution of skills through both directing (Landin & Herbert, 1999) and shifting (Hardy, 2006; Hardy *et al.*, 2010) attentional focus to the correct cues, aiding the decision making process, and initiating the correct effector mechanisms (Hardy *et al*., 2010; cf. Landin, 1994 for a review; Landin & Herbert, 1999).

The clear experimental support for the use of both imagery and self-talk in facilitating the learning and execution of skills has made it appealing to recommend the combined use of the strategies in serving this function (Hardy *et al.*, 2001a). However, before these recommendations can be formulated, a number of factors pertinent to the independent use of imagery and self-talk need to be considered. Firstly, although there is much support for the role of imagery in facilitating the learning and execution of skills, there are still a number of ambiguities as to which imagery content is most appropriate for serving this function. For example, there is incomplete understanding as to which imagery perspective (Callow & Hardy, 2004; Hardy & Callow, 1999; White & Hardy, 1995), attentional foci (Bernier & Fournier, 2010; Caliari, 2008), and nature (Shaw & Goodfellow, 1997; Taylor & Shaw, 2002; Woolfolk, Murphy, Gottesfeld, & Aitken, 1985a; Woolfolk, Parrish, & Murphy, 1985b) is most appropriate for facilitating the learning and execution of skills. Similar attention is warranted with regards to both the optimum nature of self-talk for serving this function, and the problems associated with its use during competition. Consequently, the following section of this review will appraise some of the factors that may influence the effective use of imagery and self-talk in facilitating the learning and execution of skills. It is important to consider these factors as they may have implications for the combined use of the strategies when facilitating the learning and execution of skills.

It is well understood, as a result of the development of the functional equivalence theory (Holmes & Collins, 2001; 2002), that effective imagery is both vivid and multisensory. In addition to this understanding, it is widely accepted that there is considerable individual variation between athletes in their ability to form these ‘clear’ images (Isaac, 1992). Despite this, there is still limited knowledge as to which imagery perspective is most effective when imagining the execution of skills. When athletes create images of the execution of skills, they can do so from either an internal or external perspective (Callow & Hardy, 2004; Hardy & Callow, 1999; White & Hardy, 1995). An internal imagery perspective involves imagining doing something as if in one’s own body. An external perspective involves imagining doing something as though standing outside of the body looking upon one’s self (White & Hardy, 1995). There are several reasons why there is limited understanding about which imagery perspective is most effective for the execution of skills.

Firstly, early definitions of imagery perspective were often confused with imagery modality (Hall, 1997; Morris *et al.*, 2005; White & Hardy, 1995). Both Mahoney and Avener (1977) and Mahoney, Gabriel, and Perkins (1987) defined internal imagery as the **kinaesthetic** imagination of doing an action within the body and external imagery as the **visual** imagination of doing something outside of one's body. As a consequence of these incorrect definitions, early field-based research that examined which imagery type elite athletes reported using most, found that elite athletes reported using internal imagery (confused with kinaesthetic imagery) more than external imagery (Mahoney & Avener, 1977; Mahoney *et al.*, 1987). As a result, it was suggested that this was the more effective imagery perspective for optimal performance (Mahoney & Avener, 1977; Mahoney *et al.*, 1987).

However, when more accurate definitions were applied, research revealed that both internal and external imagery perspectives could be used to invoke kinaesthetic imagery, thus potentially adding support to the efficacy of both imagery types (Hardy & Callow, 1999; White & Hardy, 1995). The inducement of kinaesthetic imagery is deemed to be indicative of effective imagery use and optimal performance, as it works in replicating 'real life' more effectively than imagery that does not employ its use (Holmes & Collins, 2001). Later research by Callow and Hardy (2004) further found that external imagery was more positively related to kinaesthetic imagery use than internal imagery in tasks dependent on form. It was argued that this was because in tasks, where form is important, one must have a clear visual image of where their limbs need to be in order to experience kinaesthetic sensations.

Leading on from this line of enquiry, it was hypothesised that the effectiveness of internal and external imagery may be task dependent (White & Hardy, 1995). More specifically, it was proposed that internal imagery would be more effective for tasks based on perception and modification (e.g. slalom-canoeing) because athletes could practice changes in visual fields using internal imagery. In contrast, it was suggested that external imagery would be more beneficial for tasks dependent on form (e.g. gymnastics), because athletes could use imagery to create a model from which they could learn (White & Hardy, 1995).

There has been mixed support for these proposals. For example, Hardy and Callow (1999) presented findings from three studies that supported the suggestion that external imagery was more effective in developing skilled performers' execution of tasks dependent on form (karate, gymnastics, bouldering). However, when White and Hardy (1995) examined the effects of internal and external imagery on both a task dependent on perception and modification (indoor slalom canoe), and a task dependent on form (movement sequences for rhythmic gymnastics), results revealed that the use of internal imagery resulted in fewer errors on the slalom canoe task, but that external imagery resulted in quicker performance times. The authors explained this unexpected result from two perspectives. Firstly, they suggested that the competitive nature of the task may have caused the external imagery group to perform more quickly than the internal imagery group. However, the most conceivable explanation for the internal imagery group's slower race times was that they were exposed to higher processing loads as a result of having to convert course information from an external perspective to an internal perspective.

No support for the use of external imagery on the form dependent task was found, although it was suggested that the low skill level of participants for this task may have resulted in them showing no improvements. This is likely due to the fact that performance is extremely variable in the early stages of learning (Schmidt & Lee, 2005). Moreover, research has revealed that the benefits associated with the use of imagery on completely novel skills are limited because athletes have no mental blueprints of the skill on which to build (Ramsey, Cumming, & Edwards, 2008). Despite these considerations, before using the findings to reject the task demands hypotheses, a methodological flaw in the study must be discussed. It was apparent that the participants were not provided with any imagery training or guidance. It is common practice to provide athletes with guidelines for the creation of images (Callow & Hardy, 2004; Hardy & Callow, 1999). The lack of guidance could have meant that the participants were unable to create controlled images of the task and, as a consequence, experienced no improvements in performance.

The ambiguity in the literature presented means that there is still limited understanding as to which imagery perspective is most appropriate for facilitating the execution of skills. Moreover, recent research has suggested that other factors may also dictate the effectiveness of internal and external imagery. For example, the development of the functional equivalence theory led Holmes and Collins (2001) to suggest that the use of internal imagery was more effective than external imagery because it replicated 'real' life more closely. There is support for the use of imagery that has adopted the use of the PETTLEP guidelines over imagery that does not (Smith, Wright, & Cantwell, 2008). However, it is difficult to ascertain the individual contribution that the use of internal imagery has over external imagery when considering this research.

In addition, findings from descriptive studies by Fournier, Deremaux, and Bernier (2008) and Bernier and Fournier (2010) appear to suggest that preferences for the use of internal and external imagery perspectives may be dependent on skill level and sport type. For example, Fournier *et al.* (2008) found that less skilled skydivers used external imagery perspectives more than expert skydivers, who were found to make more use of internal imagery perspectives. Additionally, Bernier and Fournier (2010) found that highly skilled golfers were more reliant on the use of internal imagery perspectives. As a consequence of these initial findings, further research is warranted to determine the performance effects associated with the use of different imagery perspectives when these potential influential determinants of use are considered.

The research profiled demonstrates that there is still limited understanding with regards to which imagery perspective is most appropriate for facilitating the learning and execution of skills. There have been suggestions that the efficacy of the strategies may be task (Hardy & Callow, 1999), skill level (Fournier *et al.*, 2008) and sport-type dependent (Bernier & Fournier, 2010). Furthermore, as previously stated, it has more crudely been suggested that internal imagery may be more effective than external imagery as it replicates ‘real’ life more closely (Holmes & Collins, 2001). The mixed messages regarding which imagery perspective is most appropriate, when using the strategy to facilitate the learning and execution of skills, make it difficult to formulate recommendations for how imagery should be used to serve this function. Consequently, at this stage, it may be most appropriate to adopt the recommendations forwarded by Gordon, Weinberg, and Jackson (1994). Upon finding no differences in the effectiveness of internal and external imagery in cricket bowling performance, they proposed that athletes should employ the use of the imagery type that they feel most comfortable employing.

Building upon findings relating to imagery perspective, recent research has looked more specifically at the most appropriate attentional foci to adopt when creating images of the execution of skills (Bernier & Fournier, 2010; Caliari, 2008). It is widely understood that when athletes learn or execute skills they can adopt either an internal or external attentional focus. For example, one can focus on the outcome effects of their movements or on the movements themselves (Wulf & Prinz, 2001). When adopting an external focus, it has been further specified that athletes may take a proximal (focussing on an external object close to oneself e.g., focussing on the position of a golf clubface) or distal focus (focussing on an external object far away from oneself e.g. the trajectory of a golf ball; McNevin, Shea, & Wulf, 2003). Current research suggests that athletes' performance may benefit from the use of an external distal focus more than an external proximal or internal focus because it better allows for the use of natural control mechanisms (Bell & Hardy, 2009; McNevin *et al.*, 2003). This is deemed to be of benefit because high level performance is characterised by the autonomous execution of skills (Schmidt & Lee, 2005). Furthermore, the active internalisation of focus on the execution of skills has been found to lead to their over conscious analysis and subsequent degradation (Mullen & Hardy, 2000).

The concept of attentional foci has recently been applied to the study of imagery with it being argued that when athletes imagine the performance of skills, they may similarly adopt different internal and external foci (Bernier & Fournier, 2010; Caliari, 2008). Research into the effectiveness of different imaginal attentional foci on the performance of skills has produced mixed results. For example, novice athletes were found to perform a table tennis forehand task better when they imagined the skill from a proximal external attentional focus (imagining the trajectory of the racket) than they did when they imagined it from a distal external attentional focus (imagining the trajectory of the ball; Caliari, 2008). To date, no research has examined the performance effects associated with skilled athletes' use of different imaginal attentional foci. However, field-based research has provided some indication of the preferences that skilled athletes have for the adoption of different attentional imaginary foci when using the strategy to facilitate the execution of skills (Bernier & Fournier, 2010). In contrast to the study by Caliari (2008), research into expert golfers' use of imagery revealed that they preferred to imagine the outcome of a golf stroke (the trajectory of the golf ball) more than they did the process of performing the stroke (the swing; Bernier & Fournier, 2010). Although there is no performance data to support the use of the strategy in this way, it does provide some provisional indication that skill level might be a determinant of the imaginal attentional foci that athletes adopt. Experts perform many of their skills autonomously, which may 'free up' their attentional systems to focus on other external stimuli. It may, however, not be possible for novices to do this. This is because they are unlikely to have the requisite knowledge to make the link between the overall outcome and the actual production of the skill (Caliari, 2008). Whilst these findings provide initial evidence for the importance of imaginal attentional foci in aiding the performance of skills, further research is needed to experimentally determine the most appropriate attentional foci to adopt when using imagery to facilitate the learning and execution of skills.

Along with considering the role that both perspective and attentional foci play, the nature of the imagery adopted also warrants attention. When imagining the execution of skills, athletes can create images of the outcome being either successful (positive) or unsuccessful (negative). Early field-based research found that elite athletes reported less use of negative imagery than non-elite athletes (Barr & Hall, 1992; Hall *et al.*, 1990). These findings provided an early indication that negative imagery may be associated with lower performance standards. However, it is important to note that findings from the profiled studies did not provide any indication as to whether the less skilled athletes were using more negative imagery because they were unable to control or avoid its use, or whether they were actively employing it. This is an important consideration as research by MacIntyre and Moran (2007) revealed that some athletes do actively employ the use of negative imagery to imagine worst case scenarios with the purpose of aiding performance. In further support of this point, Short *et al.* (2002) argued that positive and negative imagery should be re-conceptualised as being facilitative and debilitative respectively, as there may be considerable variation between athletes in what they perceive to be positive and negative imaginary outcomes.

To add to the limited understanding obtained from observational research, findings from experimental studies that have compared positive and negative imagery have been equivocal. For example, Shaw and Goodfellow (1997), Short *et al.* (2002) and Woolfolk *et al.* (1985a) all found that novice golfers' performances on simple putting tasks improved with the use of positive imagery (imagining the ball going into the hole) and deteriorated with the use of negative imagery (imagining the ball narrowly missing the hole). The participants in the control conditions experienced performance improvements, although these increases were not significant or as high as those produced with the use of positive imagery. Woolfolk *et al.* (1985a) explained these findings, postulating that positive imagery increased participants' expectations of success, whereas negative imagery lowered their levels of self-confidence, as participants could not envisage themselves being successful in the performance of the task. These constructs however were not directly assessed, which consequently makes it difficult to determine whether they were the underlying reasons for the results obtained.

Despite the apparent support for the use of positive imagery over negative imagery, when conducting a similar study with both skilled and unskilled golfers, Taylor and Shaw (2002) found that although the use of negative imagery resulted in putting performance degradations, the use of positive imagery did not result in greater performance improvements than the control condition. This result was consistent with earlier findings from a similar study (Woolfolk *et al.*, 1985b). In order to explain the lack of performance improvements associated with the use of positive imagery, Taylor & Shaw (2002) postulated that negative imagery may have a more detrimental impact upon confidence reduction than positive imagery does on confidence elevation.

Although the research profiled appears equivocal as to the role that positive imagery plays in skill improvement, an explanation for these differences may be provided by comparing the methodology employed by the studies. Firstly, the imagery scripts employed by Taylor and Shaw (2002), in contrast to those used in the other studies, focussed only on outcome imagery rather than outcome imagery combined with process imagery. As such, although the participants in this study could ‘see’ what they wanted to achieve, they were given no direction as to how they could do this. An implication of this may have been that they were then unable to elevate their performance standards. Furthermore, in contrast to the other studies profiled, Taylor and Shaw failed to account for ceiling effects. As such the design of the study may have not permitted participants to improve their putting performance with the use of positive imagery. In addition to these methodological flaws, Woolfolk *et al.* (1985b) posited that they too may have found no performance effects with the use of positive imagery, because the study design that they employed (testing was conducted over a number of days) may have encouraged a learning effect in all groups. Additionally, the small participant numbers within each group may have made it difficult to obtain an identifiable performance gain with the use of positive imagery. Along with these methodological issues, it is possible that performance effects with the use of positive imagery were not found consistently across all studies because the participants did not find the positive images facilitative. To explain this point further, Short *et al.* (2002) argued that different athletes may have different perceptions about whether images are facilitative or debilitative. In relation to the studies profiled it may be possible that positive imagery was not found to be beneficial to performance because athletes perceived the images to be unrealistic in relation to their performance ability. All these findings considered together indicate that understanding about which imagery content is most appropriate for facilitating the learning and execution of skills remains limited. This consequently makes formulating recommendations for the use of imagery and self-talk together to facilitate the learning and execution of skills difficult.

In addition to the ambiguities associated with imagery, there are several issues pertinent to the use of self-talk in facilitating the learning and execution of skills that warrant attention. Descriptive research has revealed that athletes widely report the use of self-talk to serve these functions (Gammage *et al.*, 2001; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a). However, although athletes make use of the strategy, its use does not, as with other functions (nerve control, relaxation, mental preparation self-talk etc.), increase in competition compared to practice (Hardy *et al.*, 2005a). It has been suggested that this may be because of the potentially harmful effect that the overuse of instructional self-talk, in stressful competitive situations, can have on performance (Hardy *et al.*, 2005a). To explain this further, research has found that the use of internally facing instructional self-talk under stressful conditions can lead to the over-conscious analysis of skills and ultimately result in performance decrements (Masters, 1992). As such it may be possible that when using self-talk to facilitate the learning and execution of skills, athletes should either reserve use for training in non-stressful situations or, as Bell and Hardy (2009) recently found, ensure that the self-talk directs attention to external stimuli rather than to oneself. Moreover, it has been suggested that athletes should represent their instructional self-talk in a shortened format, as this reduces the chance of over-consciously analysing skills and overloading of attentional systems (Magill, 2007; Zinsser *et al.*, 2010).

Along with these considerations, there is still much ambiguity regarding the optimum nature of self-talk used to serve skill enhancement functions. As with imagery, verbalisations to the self can be both positive (encouraging) and negative (critical). Descriptive research has revealed that athletes employ positive self-talk more than negative (Gammage *et al.*, 2001; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a). Furthermore, most self-talk guidelines recommend the use of positive self-talk over negative self-talk (Zinsser *et al.*, 2010; Weinberg & Gould, 2006). This is largely due to the facilitative relationship that positive self-talk is believed to share with self-confidence and positive affect (Hardy *et al.*, 2001b; Hardy, Hall, & Alexander, 2005b; Zinsser *et al.*, 2006), and the debilitative relationship that negative self-talk is believed to share with anxiety (Goleman, 1995).

Although it is widely theorised that positive self-talk should be used over negative self-talk (Zinsser *et al.*, 2010; Weinberg & Gould, 2006), support for these assertions is mixed. Experimental research has found greater skill performance improvements with the use of positive self-talk (Dagrou, Gauvin, & Halliwell, 1992; Van Raalte, Brewer, Lewis, Linder, & Kozimor, 1995) although findings from field-based research has been less supportive (Hardy *et al.*, 2001a; Johnson, Hrycaiko, Johnson, & Halas, 2004; Theodorakis *et al.*, 2000). For example, Mahoney and Avener (1977) found that more successful Olympic gymnasts used more positive self-talk and less negative self-talk than less successful Olympic gymnasts whilst Highlen and Bennett (1983) in contrast found that highly skilled athletes used more negative self-talk than less skilled athletes. To further add to the conflict, Rotella, Garsneder, Ojala, and Billings (1980) found no differences in the use of positive self-talk between athletes of differing skill levels, as they all used positive self-talk more than negative self-talk.

Findings from the research conducted by Highlen and Bennett (1983) and Rotella *et al*. (1980) contrast with many of the fundamental recommendations for the use of self-talk, and also raise questions as to how imagery and self-talk should be used together to serve skill enhancement functions. However, before raising these questions several factors warrant consideration. The first consideration pertains to methodological limitations and between study differences. The sample characteristics in the studies profiled were very different, with Highlen and Bennett (1983) comparing wrestlers, Rotella *et al.* (1980) exploring use in skiers and Mahoney and Aveneur (1977) examining the role of skill level in Olympic gymnasts' use. These differences in sport type could have influenced the way in which the strategy was applied as Hardy *et al.* (2005a) previously found sport type to be a determinant of self-talk use. In addition, there was considerable variation between the studies in the way in which skill level was defined and for all three studies the sample sizes used were extremely small (as few as 13). As such, the natural variability associated with data from Likert scales in small samples may explain the conflicting results.

Whilst these methodological limitations may serve in providing some explanation for the variation in athletes' use of positive and negative self-talk, it is important to consider that the evidence presented does appear to suggest that athletes' use of the imagery and self-talk for serving skill enhancement functions is highly idiosyncratic. As with imagery, it is possible that athletes might have very different perceptions about the 'helpfulness' of their positive and negative self-talk. For example, some athletes may perceive negative self-talk to be of benefit to their performance and might use it as a form of tension release (Van Raalte, Cornelius, Brewer, & Hatten, 2000). These considerations taken together would appear to suggest that it may be difficult to formulate recommendations for the combined use of imagery and self-talk to facilitate the execution of skills.

To conclude, the purpose of this section of the review was to illustrate the functional similarity between imagery and self-talk in facilitating the learning and execution of skills. Furthermore, it sought to demonstrate why there have been calls for the combined use of the strategies in serving this function, whilst also appraising the literature that may provide opposition to these suggestions. The research profiled illustrates that both imagery (Feltz & Landers, 1983) and self-talk (Landin, 1994) can be used to successfully aid the learning and execution of skills, although the mechanisms through which they serve this function are different. There is evidence to suggest that imagery facilitates the execution of skills by developing mental blueprints, strengthening muscle memory and priming behavioural outcomes (Homes & Collins, 2001). In contrast, although based on less empirical evidence, it has been suggested that self-talk facilitates the acquisition and execution of skills by directing attention to the correct cues, facilitating the decision making process and initiating the correct effector mechanisms (Landin, 1994).

Whilst the ability of both imagery and self-talk to aid the learning and execution of skills make it intuitively appealing to suggest that there may be additive effects associated with their combined use, the appraisal of the relevant literature indicates that a number of factors warrant consideration before the formulation of these recommendations. For example, there is still limited understanding as to how imagery and self-talk are best used to serve skill enhancement functions independently of each other. Moreover, the limited theoretical understanding about how self-talk works in aiding the execution of skills (Hardy, 2006; Hardy *et al*., 2010) compared with imagery (Holmes & Collins, 2001), and the issues associated with its overuse in stressful competitive scenarios (Mullen *et al*., 2000), make it appealing to suggest that imagery should be used instead of self-talk to serve this function. Despite these considerations, there is evidence to support the combined use of imagery and self-talk in facilitating the learning and execution of skills (Hall *et al.*, 1997). This will be discussed further in section 2.4. Moreover, research has demonstrated the relative importance of both strategies in serving skill enhancement functions, with studies comparing their effectiveness finding both to be beneficial in serving this function (Masciana, Van Raalte, & Brewer, 2001; Rogers, Hall, & Buckolz, 1991).

2.3.1.2 Learning and executing strategies

The purpose of the following section is to outline how both imagery and self-talk have been used independently to facilitate the learning and execution of strategies and tactics, as a precursor to considering how they might be used in conjunction. Athletes widely report the use of imagery (Bernier & Fournier, 2010; Munroe *et al.*, 2000; Nordin & Cumming, 2005a; Salmon et al., 1994) and self-talk (Hardy *et al.*, 2001a; Hardy *et al.*, 2005a) to facilitate the learning and execution of strategies and tactics. Research has suggested that CG imagery is the most appropriate type for serving this function (Hall *et al.*, 1998; Paivio, 1985). Despite this, until recently, there had been no experimental research determining the effect that this imagery type had on the learning and execution of strategies and tactics (Martin *et al*., 1999; Munroe *et al.*, 2000). A study conducted in 2005 by Munroe-Chandler, Hall, Fishburn, and Shannon, examining the performance effects of CG imagery on football performance, provided little support for the use of this imagery type in facilitating this function.

This staggered multiple baseline design across behaviours study examined the effect that CG imagery training had on a group of junior female footballers' team performance of three strategic skills (defending a direct free kick, taking a direct free kick and defending a corner). Imagery scripts were delivered to the footballers during three training sessions and focussed on enhancing players' performance of the three strategic skills. The imagery scripts used were based on the bioinformational theory (Lang, 1977) which recommends that when creating images, athletes should imagine both the stimulus that they may be presented and their emotional responses. See section 2.3.2.2 for a more thorough discussion of the bioinformational theory. Football performance was video recorded over seven matches with and without the use of the intervention, and observers assessed the footballers' performance of the strategic skills. Despite the original objective of the study, there was only enough data to comment on the effect of imagery on one of the strategic skills (defending a corner). Results revealed no differences in the players' performance of the strategic skills between the baseline and the implementation of the imagery training programme. However, the use of a shortened version of the SIQ revealed that the imagery training resulted in an increase in the players' use of CG imagery as well as MG-A imagery.

Although the lack of performance effects suggest that CG imagery does not impact positively upon strategic play, a number of methodological issues were highlighted that could explain the result. It was acknowledged that imagery training was only delivered over a short period of time. Moreover, there were difficulties associated with the collection of full strategic play performance data. Most importantly, however, it was suggested that using imagery scripts based on principles from the bioinformational theory could have resulted in the study examining the effectiveness of MG-A imagery rather than CG imagery. MG-A imagery scripts typically involve the imagination of optimum levels of arousal. The CG imagery scripts used in the study profiled incorporated large aspects of this activity. Consequently, it may be premature to discredit the use of CG imagery in facilitating the execution of strategies.

Findings from a recent study (Bernier & Fournier, 2010), which examined the functions of golfers' imagery use, may also help in providing some insight as to why no performance effects were found with the use of CG imagery. When golfers were asked to describe their use of imagery to facilitate the strategic execution of skills they often reported imagining a range of different shot options, imagining their trajectories, before selecting the most effective shot type (Bernier & Fournier, 2010). The process of 'weighing up' different options when planning a strategy appears to be central to the process. As such, the use of imagery scripts with set outcomes, such as the ones used in the study profiled, may not have allowed for sufficient planning to be undertaken. This may go some way to explaining the lack of performance effects found. A further explanation for the result may lie in the fact that athletes might use a variety of different images to serve strategic functions. This notion is supported by Nordin and Cumming (2005a) who found that dancers used a range of imagery types to help them solve problems, (e.g., body related images, execution images and irrelevant images). To conclude, although athletes widely report the use of imagery to facilitate the learning and execution of strategies and tactics, further experimental research that overcomes the issues associated with the study presented by Munroe *et al.* (2005), is required to ascertain the performance effects associated with using imagery in this way.

Whilst only one study has experimentally assessed the effectiveness of CG imagery in facilitating the learning and execution of strategies, no studies have tested the influence of self-talk in serving this function. This is despite descriptive studies revealing that athletes use self-talk to facilitate the learning and execution of strategies and tactics (Hardy *et al.*, 2001a; Hardy *et al.*, 2005a). It is clear that athletes use both imagery and self-talk to serve this function. However, further experimental research is required to determine their effectiveness in doing so, both independently and in combination.

2.3.2 Motivational functions

Although athletes report the use of both imagery (Arvinen-Barrow *et al.*, 2008; Gregg & Hall, 2006; Short *et al.*, 2004) and self-talk (Gammage *et al.*, 2001; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a) to facilitate the learning and execution of skills and strategies, they most widely report their use to serve motivational functions. The motivational functions of imagery and self-talk pertain to when the strategies are used to serve mastery, anxiety control and drive enhancement functions. The use of the umbrella term 'motivational' for the functions outlined above has been criticised by Short, Ross-Stewart, and Monsma (2006) who expressed concern that it is not concordant with what many Sport Psychologists understand it to be. However, in spite of these concerns the term is routinely used within imagery and self-talk research and will therefore be used throughout this thesis. The following sections of the review will present evidence for the use of both imagery and self-talk in serving mastery, anxiety control and drive enhancement functions. They will also detail any ambiguities regarding their 'best use' independently when serving these functions.

2.3.2.1 Mastery

The following section of the review will present evidence for the mastery functions of both imagery and self-talk independently of one another. It will demonstrate the commonality between the two strategies in serving this function, whilst outlining any issues that may influence recommendations for use. The mastery functions of imagery (Hall *et al.*, 1998; Munroe *et al.*, 2000) and self-talk (Gammage *et al.*, 2001; Hardy *et al.*, 2001a) refer to when the strategies are used to enhance athletes' self confidence, mental toughness, feelings of control and focus. Traditionally when these functions have been examined, research has focussed on the effect they have on self efficacy and self confidence. This focus is to be expected given the positive relationship that heightened levels of confidence share with performance (Burton, 1988; Jones, Swain, & Hardy, 1993; Woodman & Hardy, 2003), and the beneficial effect that both self confidence and self efficacy are believed to have on other desirable outcomes, such as increased effort, persistence and improved concentration (Bandura, 1986; Moritz, Feltz, Fahrbach & Mack, 2000).

Self efficacy is the belief that a person has in their ability to perform a specific task or attain a specific outcome (Bandura, 1986). It is proposed that there are four ways that self efficacy can be elevated, namely performance accomplishments, vicarious experiences, verbal persuasion and emotional arousal (Bandura, 1986). Successful past performance accomplishments are believed to be the greatest source of self efficacy followed by vicarious experiences (Feltz, 1984). Vicarious experiences involve a person watching another person, of similar ability, performing a skill successfully. This leads to elevations in self efficacy as it increases an athlete's perceptions that they also have the ability to perform the skill successfully. Feltz (1984) posited that imagining oneself performing a task successfully can be a form of vicarious experience. This proposal suggests that the use of cognitive specific imagery may be effective in heightening levels of self efficacy, although Martin *et al.* (1999) also profiled literature supporting the use of motivational-general mastery imagery in serving this function. The rationale presented for its use was that athletes could increase their self efficacy by imagining the confident feelings associated with the production of a skill.

Although it is of intuitive appeal to suggest that both CS and MG-M imagery types can be used to enhance self efficacy results supporting these claims remain equivocal. Firstly, McKenzie and Howe (1997) found only partial support for CS imagery in self efficacy enhancement when they conducted a multiple-baseline-across-subjects study. Upon recruiting six participants, their levels of self efficacy for a blindfolded dart throwing task were assessed at baseline (seven days of trials) and with the use of an imagery intervention, accompanied with relaxation (a minimum of fifteen days of trials). Results revealed that ratings of self efficacy with the use of the intervention improved in only two of the participants and decreased in two of the participants. It was suggested that ratings of self efficacy might have lowered in some of the participants because they could hear if they had missed the target. As such, the awareness of these negative performance accomplishments may have negatively affected their belief in their ability and overridden the effect of imagery. The authors also concluded that imagery worked in enhancing self efficacy only if participants' had high imagery ability, dart throwing experience and believed in the intervention and had prior experience of imagery use. However, no evidence was presented to support this suggestion. Additionally, it was difficult to ascertain the importance of imagery alone in elevating self efficacy, as relaxation was also central to the intervention employed.

Despite the apparent limited support for the use of CS imagery in self efficacy enhancement, later studies conducted by both Nordin and Cumming (2005b) and Short *et al.* (2002) concluded that both MG-M and CS imagery could be influential in the elevation of self efficacy and performance. However, caution must be applied when considering these findings. Upon inspection of both of the results sections, it was unclear if Nordin and Cumming (2005b) had compared the ratings of self efficacy with the use of MG-M and CS imagery, to those of the control group. Furthermore, when considering the findings by Short *et al.* (2002), it must be noted that the effectiveness of CS and MG-M imagery in serving self efficacy enhancing functions was influenced by the relationship between gender and whether the images were represented in facilitative or debilitative forms.

To add to these ambiguities further, findings from another non-experimental study revealed that pre-competitive MG-M imagery use, in skilled golfers, was more strongly related to pre-competitive self efficacy elevation than CS imagery, and that the use of this imagery type was predictive of better performances (Beauchamp, Bray, & Albinson, 2002). These results appear to cast more doubt over the effectiveness of CS imagery than MG-M imagery in its ability to elevate self efficacy. However, it must be noted that this lack of support may be a consequence of poor measures of self efficacy being employed (Beauchamp *et al.*, 2002). It is widely acknowledged that some of the ambiguity in the field of self efficacy research has occurred as a result of issues associated with its measurement (Moritz *et al.*, 2000). Bandura (1986) originally proposed that the microanalytic technique should be used as the means for measuring self efficacy. This technique typically requires participants to rate their confidence for the performance of increasingly difficult different tasks. However, these recommendations have been ignored on a number of occasions with some researchers using only single item assessments to determine athlete levels of self efficacy. This can be a problematic approach as it can result in participants rating their confidence in the overall outcome rather than their efficacy for specific tasks (Moritz *et al*., 2000). Additionally, some measures have been criticised for being more general than others. For example, some of the measures of self efficacy used in previous studies asked participants to rate only how confident they were in their ability to perform successfully (Moritz *et al*., 2000). Although the measure of self efficacy used by Beauchamp *et al*. (2002) was specific, it identified athletes' confidence in their ability to achieve their goals and manage stress, rather than their ability to execute skills. This may explain why CS imagery was not related to self efficacy elevations in this study.

These considerations go some way to explaining the variation observed in the effectiveness of MG-M and CS imagery in self efficacy enhancement. However, another explanation for the mixed results might be provided by considering the role of skill level differences. Both Nordin and Cumming (2005b) and Short *et al*. (2002) used novice participants in their studies, whereas Beauchamp *et al*. (2002) recruited expert golfers. Nordin and Cumming (2005b) and Short *et al*. (2002) both found CS and MG-M imagery to facilitate the elevation of self efficacy. However, Beauchamp *et al*. (2002) found only MG-M imagery to be related to elevations in self efficacy in elite golfers. It might be possible that novice athletes experience greater elevations in self efficacy with the use of CS imagery than skilled athletes, because they use it to increase their understanding of how to execute the skill, which in turn makes them more confident. Skilled athletes however, already have this information stored autonomously and are likely to experience minimal benefits with the use of CS imagery. This adds to the ambiguity regarding the use of imagery for self efficacy enhancement purposes. In conclusion, although there is partial evidence for the use of imagery in self efficacy enhancement, it remains unclear as to which imagery types are most effective in serving this function.

Like imagery, there is partial evidence supporting the use of self-talk in self efficacy enhancement (Hatzigeorgiadis, Zourbanos, Goltsios, & Thoedorakis, 2008). It is posited that verbal persuasion (someone talking to an athlete encouragingly, or an athlete talking to themselves encouragingly) is an effective means for self efficacy enhancement, although it was originally suggested that the use of this strategy alone would have little lasting power in elevating self efficacy (Bandura, 1986). The rationale for this argument was that verbal persuasion, unlike past performance accomplishments and vicarious experiences, would be of little use in providing people with the requisite technical knowledge for producing skills (Wise & Trunnell, 2001).

Despite these early suggestions, findings from two recent studies have provided some support for the use of self-talk in building self efficacy and improving performance (Hardy, Hall, Gibbs, & Greenslade, 2005b; Hatzigeorgiadis *et al.*, 2008). When the relationship between the use of a variety of self-talk types and self efficacy was examined, it was found that self-talk use was moderately positively correlated with self efficacy (Hardy *et al.*, 2005b). Furthermore, self efficacy was related to performance although self-talk was not. Additionally, findings from a more recent study also supported the effectiveness of self-talk in self efficacy enhancement, when the effect of motivational self-talk on self efficacy and tennis forehand stroke performance was examined. Results revealed that tennis players who used motivational self-talk increased their levels of self efficacy and performance significantly more than those in a control group (Hatzigeorgiadis *et al.*, 2008). It was also found that the performance increases were related to elevations in self efficacy. Although the studies profiled appear to provide early support for the role of self-talk in self efficacy enhancement, research into this line of enquiry is still in its infancy. As such further research is required before meaningful conclusions about its impact can be drawn.

In spite of the limited and ambiguous findings regarding the role of imagery and self-talk use in self efficacy enhancement, one study has examined the combined effect of using the strategies in serving this function (Cumming *et al*., 2006). Cumming *et al*. (2006) examined the effect of combining facilitative and debilitative imagery and self-talk on dart throwing performance and self efficacy. Students (N=95) with little to no dart throwing experience were recruited and allocated to one of five groups (debilitative imagery and debilitative self-talk, facilitative imagery and facilitative self-talk, debilitative imagery and facilitative self-talk, debilitative self-talk and facilitative imagery, control). Each group took part in a baseline trial and then two experimental trials where they threw 24 darts using the intervention strategy that they had been allocated.

Findings revealed that the performance of the debilitative self-talk with facilitative imagery group remained constant between the baseline and trials one and two. However, the facilitative self-talk with debilitative imagery group experienced improved performance in trial two compared to the baseline condition and trial one. The control group's performance remained constant across the three conditions. Additionally, the performance of those using debilitative imagery and self-talk decreased from baseline to trial one but improved moderately in trial two. However, the finding of most interest was that the performance of those that used facilitative imagery and self-talk together increased significantly from baseline to trial one and remained at this elevated level in trial two. Despite these findings, no effects for self efficacy were found with all groups' ratings of self efficacy decreasing from baseline to trial one. It was argued that this effect may have occurred because the participants were rating their levels of self efficacy based on their baseline performances, rather than the use of the strategies. It was concluded that there were additive effects associated with the use of facilitative imagery and self-talk types. Despite these findings it must be noted that the effects of using the strategies in isolation were not examined. This makes it difficult to ascertain if the use of facilitative imagery and self-talk in combination was more effective than the use of just one of the strategies. As such, further research comparing the effects of using facilitative imagery and self-talk, in combination and isolation, on self efficacy is warranted.

Although there is much ambiguity regarding the role of imagery and self-talk in self efficacy enhancement, results have been more conclusive with regards to their effect on the more global construct of sport confidence. Sport confidence is an athlete's belief in their ability to be successful in sport in general (Vealey, 1986). MG-M imagery has traditionally been recommended as the most effective imagery type to use when athletes are seeking to elevate levels of self confidence (Hall *et al.*, 1998). The use of MG-M imagery works on the premise that if an athlete wants to feel more confident, they should imagine being confident (Moritz *et al.*, 1996). The development of the functional equivalence theory provides theoretical support for this suggestion, with research revealing that the imagination of emotional and behavioural outcomes can result in them actually occurring (Holmes & Collins, 2001).

Support for the use of MG-M imagery in serving confidence enhancing functions has been found in both correlational and single-subject multiple baseline across individuals studies. Research has revealed MG-M imagery use to be a differentiating factor between confident and less confident roller skaters (Moritz *et al.*, 1996), and that athletes consistently report the use of MG-M imagery to build, maintain and regain confidence (Ross-Stewart, & Short, 2009). Further research by Callow *et al.* (2001) found that the implementation of a pre-competitive MG-M imagery training programme resulted in elevations in sport confidence (assessed using the state sport confidence inventory) in three out of four high level junior badminton players in a multiple single baseline study (Callow *et al.*, 2001).

Although these findings together appear supportive of the use of MG-M imagery in serving confidence enhancing functions, caution must be applied as no performance measures were recorded in any of the studies profiled. Consequently, although athletes may make use of MG-M imagery to elevate confidence, its use may not result in performance improvements. Additionally, it is important to acknowledge that research has revealed that athletes may also employ other imagery types to serve this function (Short *et al.*, 2004). In support of the last point sport confidence in highly skilled netballers has been found to be most associated with the use of MS imagery, whereas less skilled netballers' confidence was most related to MG-M and CG imagery use (Callow & Hardy, 2001). It was argued that the less skilled athletes may have used MG-M and CG imagery more to increase confidence, as it helped them overcome challenges and allowed them to practise strategies that they had not yet mastered. In contrast, it was proposed that the more skilled athletes may have preferred to create images of their ultimate goal to increase motivation and confidence, as they had already mastered these strategies.

Later research (Abma *et al*., 2002; Short *et al*., 2005), that compared imagery use in highly confident and less confident athletes (identified by their Trait Sport Confidence Inventory (TSCI; Vealey, 1986) responses), provided further support for the suggestion that athletes can use a variety of imagery types to enhance sport confidence. For example, research by Abma *et al*. (2002) found that highly confident track and field athletes used significantly more CS, CG, MS, MG-A and MS imagery than their less confident counterparts (Abma *et al*., 2002). Furthermore, when Short and Short (2005) compared imagery use between confident and non-confident footballers, using two different methods (one method assessed the types of imagery that the footballers used using the SIQ, the other assessed footballers' perceptions of the imagery that they used), they found no differences between the two groups in their use of MG-M imagery. However, they did find that the more confident footballers used more images that they perceived to serve confidence enhancing functions than the less confident footballers. These findings indicate that a variety of imagery types can be used to elevate confidence and reiterate the importance of the athlete's perception of the imagery function.

Whilst there is extensive research supporting the use of imagery for enhancing sport confidence, there is only one study supporting the use of self-talk for serving this function. Hatzigeorgiadis, Zourbanos, Mpoumpaki, and Theodorakis (2009) conducted this study when they examined the effects that the use of instructional and motivational self-talk had on sport confidence and performance in tennis players. Seventy two tennis players were recruited and placed into either a control or experimental group. All participants' baseline anxiety, self confidence and forehand stroke performance measures were taken on day one. On days two, three and four, the experimental group used motivational and instructional self-talk whilst practicing a backhand skill, while the control group just practiced the same skill without the use of self-talk. On day five all the measures that were taken on day one were taken again. Results revealed that self confidence increased, cognitive anxiety decreased and performance improved in the experimental group compared with the control group. Furthermore, analysis revealed that rather than the changes in forehand stroke performance being due to reductions in cognitive anxiety, they were dependent on increases in self-confidence. These findings suggested that not only was self-talk influential in confidence enhancement, but that this enhancement was related to improved performance. As a result, the authors proposed that improved confidence may be a mechanism by which self-talk enhances performance.

Although these proposals are appealing, one must be careful when drawing conclusions from the data as the authors did highlight a key issue that may have confounded the relationship between self-talk, self-confidence and performance. Specifically, they detailed that measures of the players' self confidence and anxiety were taken after they had performed. Therefore it may have been possible that player performances were the main determinant of self confidence, rather than self-talk use. As a result of this fundamental issue, it is difficult to draw clear conclusions about the relationship between self-talk and self-confidence enhancement. Furthermore, a secondary issue was apparent as it was difficult to identify which self-talk type was having the main effect, if any.

In conclusion, Hardy *et al.* (2001a) previously argued that there may be additive effects associated with the combined use of imagery and self-talk in serving mastery functions. Moreover, Bandura's self efficacy theory (1986) would appear to provide a rationale for these additive effects. However, the evidence presented indicates that further research is required before recommendations for the combined use of imagery and self-talk in serving these functions can be formulated.

2.3.2.2 Anxiety control

In addition to serving mastery functions, both imagery and self-talk have been found to serve anxiety control functions. It is proposed that anxiety is a key determinant of sports performance (Humara, 2002), with debilitative interpretations of anxiety shown to be detrimental to performance (Jones *et al*., 1993). When used independently of one another, qualitative studies have revealed that athletes from a variety of different sports use imagery (Munroe *et al.*, 2000; Nordin & Cumming, 2005a; White & Hardy, 1998) and self-talk (Hardy *et al*, 2001a; Hardy *et al.*, 2005a) to control their levels of anxiety.

Independently of self-talk, it has been argued that MG-A imagery (imagining feelings of optimum arousal and anxiety levels) is the most appropriate imagery type for controlling anxiety (Paivio, 1985). The theoretical underpinning behind this proposal is largely shaped by Lang's bioinformational theory of emotional imagery (1977). This theory proposes that emotional images are stored in the mind as a series of propositions; stimulus, response and meaning. The stimulus propositions simply describe the imagined situation or scenario. The response propositions pertain to the autonomic, behavioural and physiological responses that a person might experience as a result of the imagined stimulus. Finally, the meaning propositions refer to the meaning that individuals attach to their images e.g., whether they perceive significant consequences to result from the imagined experience.

The response propositions of the bioinformational theory are of particular relevance in supporting the use of MG-A imagery for anxiety control purposes. This is because Lang (1977, 1978) theorised, and found support for the suggestion, that the imagination of particular autonomic, behavioural and physiological responses could result in them actually occurring. MG-A imagery involves the imagination of different arousal and anxiety responses. Therefore, based on the principles of the bioinformational theory, it is of intuitive appeal to suggest that MG-A imagery can be used to optimise physically experienced anxiety responses.

Despite the apparent theoretical support for the use of MG-A imagery in serving this function, its effects on physiological indicators and self-reported levels of anxiety have been equivocal (Hale & Whitehouse, 1997; Mellalieu *et al.*, 2009; Vadocz, Hall, & Moritz, 1997). An early examination of the relationship between self-reported imagery use (assessed using the SIQ) and pre-competitive anxiety responses (assessed using the competitive state anxiety inventory; CSAI-2) in elite rollerskaters, revealed that MG-A imagery was the only imagery type associated with pre-competitive anxiety (Vadocz *et al.*, 1997). MG-A imagery was found to be positively correlated with pre-competitive anxiety. This finding suggested that the increased use of MG-A imagery could be detrimental to an athlete as it was related to elevations in anxiety, which has been found to affect performance negatively (Burton, 1988; Martens, Burton, Vealey, Bump & Smith, 1990). Before coming to this conclusion, however, the issue of causality must be considered, as it may have been possible that the more anxious athletes were creating more arousing images of the competition as a symptom of their anxiety. Despite this consideration, Short *et al*. (2007) later found MG-A imagery, as assessed on the SIQ, to be perceived as the least effective of the five imagery types used by athletes.

Although the studies profiled above indicate that MG-A imagery is related to elevations in anxiety, and is negatively perceived amongst athletes, one must be careful about suggesting that it is detrimental. A recent review of sport imagery research presented the argument that the items assessing MG-A imagery use on the SIQ tend only to make assessments of athletes' use of the strategy to affect arousal responses, rather than relaxation responses (Short *et al*., 2006). This suggests issues with the validity of the MG-A subscale and its measurement of the construct, rather than the actual imagery type itself, and may go some way to explaining the negative associations with the use of this particular imagery type. The issue associated with confusing anxiety and arousal is common across a range of imagery research, with the concepts often being treated as one and the same (Short *et al*., 2004).

Subsequent research has provided an indication that MG-A imagery may not necessarily be negative when imagery scripts containing the correct response propositions are used. Hale and Whitehouse (1998) assessed the effect that two different imagery scripts (pressure response and challenge response) had on 24 male soccer players' competitive anxiety intensity and direction scores, and heart rate responses. All participants were asked to complete a baseline and two experimental conditions. The baseline involved each participant having their heart rate and self reported anxiety levels measured. Upon completion of this they took part in two further experimental trials, in a randomised order, where they were asked to perform a relaxation exercise followed by the use of either pressure response imagery or challenge response imagery. Self reported anxiety and heart rate responses were recorded in both conditions. Results revealed that the use of challenge imagery resulted in lower anxiety scores and greater facilitative interpretations of anxiety, than the use of pressure imagery. Despite this, no differences in the measure of arousal (heart rate) were found between the two conditions. This, however, may be due to several reasons. Firstly, the authors suggested that the use of the relaxation exercises prior to the presentation of the imagery scripts may have resulted in all participants experiencing low heart rates, regardless of the imagery used. Additionally, the fact that all the data were collected from each participant during the same appointment may have affected the heart rate responses experienced. Finally, although researchers commonly use arousal responses as an indication of anxiety, it can be problematic as there is considerable individual variation in the physiological anxiety responses that people experience (Landers & Arent, 2010). To conclude, findings from the study demonstrated the importance of imagery response propositions in anxiety control. However, care must be taken in claiming the effectiveness of imagery as a stress inoculation strategy, as relaxation was central to the intervention employed and performance measures were not recorded. This makes it difficult to determine whether the use of the strategy could promote performance improvements.

Despite these criticisms, further support for the use of MG-A imagery, that contains 'correct' response propositions in anxiety inoculation, were found when the effects of pre-competitive MG-A imagery training on five male rugby players' emotional states, the direction and intensity of their anxiety and imagery ability was assessed in a multiple-baseline-across subjects study (Mellalieu *et al.*, 2009). The imagery scripts utilised throughout the training programme were based on the bioinformational theory, containing both stimulus and response propositions. All scripts involved players imagining themselves in a stressful situation, but dealing with this situation appropriately. Results revealed that MG-A imagery produced more positive and less negative mood states, more positive interpretations of anxiety and increased self confidence. Findings from the study supported the notion that MG-A imagery is particularly effective for use outside of competition, as athletes can imagine how they want to feel when they are competing, thus reducing doubt and uncertainty when they actually come to compete. However, although findings provided support for the use of imagery in anxiety inoculation, performance measures were not recorded, making it difficult to determine whether the use of MG-A imagery affected global performance.

The study presented by Mellalieu *et al.* (2009) provides evidence for the use of MG-A imagery as a pre-competitive strategy. However, it is important to acknowledge that athletes may also find the use of other imagery types beneficial to anxiety management. For example, it has been suggested that perceptions of anxiety may be positively influenced by the use of MG-M imagery (Cumming *et al*., 2007). This is because extant research has found heightened levels of self-confidence to be associated with more facilitative interpretations of anxiety (Jones & Swain, 1995).

Additionally, it is also important to consider how situational factors may influence athletes' use of different imagery types for controlling anxiety. It is likely that athletes will periodically be presented with stressful situations during competition that might increase their levels of anxiety. It is important that athletes can use imagery during competition to deal with these situations. There is currently a dearth of literature examining how imagery can be used during competition to alleviate stress and anxiety, despite it being found that athletes widely employ imagery in competitive pressure situations (Weinberg *et al.*, 2003). In spite of this limited understanding, the 'stress and coping' literature can be drawn upon to provide suggestions as to how imagery can be employed during competition.

Lazarus and Folkman (1984) presented the most widely accepted transactional theory of stress and coping. They argued that the presentation of a situation, or encounter, is always accompanied by a primary cognitive appraisal whereby one makes a judgement about its importance and whether it is stressful. It is widely acknowledged that there is considerable individual variation in the situations, or encounters, that are perceived as stressful (McGrath, 1970). However, Lazarus and Folkman (1984) proposed that there were eight common underlying properties of situations that would be more likely perceived as stressful. These included, novel, unpredictable, anticipated, long duration, ambiguous, temporally and outcome uncertain events, and events at certain stages of the life cycle. Thatcher and Day (2008) confirmed these as the characteristics of stressful situations in national level trampolinists. Additionally, they identified that unfavourable comparisons with the self and others, and inadequate preparation were also common properties of stressful situations in these athletes.

Whilst these properties provide some indication of the type of situations or events that might induce stress, they provide no indication as to what perceptions of a situation lead to a stress appraisal. Lazarus and Folkman (1984) addressed this proposing that perceptions of harm and loss (damage has already occurred), threat (there is potential for some type of damage to occur) or challenge (one is excited about the difficult challenge) all characterise the stress experience.

Upon experiencing stress it was proposed that a number of emotional responses could be elicited (Folkman & Lazarus, 1985). Lazarus (2000) defines emotions as "an organised psychophysiological reaction to ongoing relationships with the environment, most often, but not always, interpersonal or social. This reaction consists of responses from three levels of analysis – namely introspective reports of subjective experiences (often referred to as affect), overt actions or impulses to act, and psychophysiological changes that make emotions organismic" (p. 230). A key component of the transactional theory of stress and coping is that emotional responses are very much dependent on the way in which a situation or encounter has been appraised (Folkman & Lazarus, 1985). For example, if a situation has been appraised as challenging it is likely that the emotions experienced will consist of excitement and eagerness, however, if the situation is appraised as harmful it is likely that feelings of anger and disappointment will ensue (Folkman & Lazarus, 1984). Of particular relevance to this section of the review is that anxiety has been identified as a potential emotional response to stressful situations that are appraised as threatening (Folkman & Lazarus, 1985). This is of concern given that negative emotions can impact detrimentally upon an individual's motivational, cognitive and physical processing capabilities (Jones, 2003).

Owing to these potentially negative consequences, it is unsurprising that people undergo a secondary appraisal whereby they ask themselves how they can then cope with the situation with which they are presented (Lazarus & Folkman, 1985). The ability to cope with stress has been identified as crucial to athletic performance (Lazarus, 2000). Coping is widely defined in the literature as 'constantly changing cognitive and behavioural efforts to manage external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (Lazarus & Folkman, 1984, p. 141).

When people are presented with stressful situations both problem and emotion focussed coping strategies can be used (Folkman & Lazaus, 1980). Problem focussed coping involves employing strategies with the intention of changing the stressful situation (e.g., strategic planning, rehearsal of moves), whereas emotion focussed coping involves the use of strategies aimed at changing the emotions experienced (e.g., positive thinking, relaxation). It is argued that problem focussed coping strategies are more beneficial in situations where people feel they can exert control over the scenario. In contrast, emotion focussed coping strategies are believed to be more effective in situations where people perceive they have little control (Folkman & Lazarus, 1980).

Imagery is frequently reported as a coping method in sport (Nicholls *et al.*, 2005a; Nicholls & Polman, 2008). More specifically, MG-M, MG-A and MS imagery types are widely emphasised as emotion focussed coping strategies (Jones, 2003; Tenenbaum, Edmonds, & Eccles, 2008). The use of imagery as a problem focussed coping strategy is under researched, although it is possible that CS and CG imagery types could be used in this way. With this in mind, during competition, it might be of more benefit for athletes to use imagery as a problem focussed strategy. This is because athletes are likely to perceive themselves to have higher levels of control over the situation that they are presented with, than they do when they are outside of competition. This proposal however is currently based on conjecture and, as such, warrants further research.

Along with the support for the use of imagery in serving anxiety control functions, there is also experimental evidence for the use of self-talk in serving this function (Hatzigeorgiadis *et al.*, 2009; Maynard & Cotton, 1993; Maynard, Smith, & Warwick-Evans, 1995). Furthermore, field-based research has revealed that athletes report nerve control and relaxation as two of the main functions of their self-talk use (Hardy *et al.*, 2005a). Researchers have recommended that athletes should employ self-talk cues that directly combat anxiety (e.g. 'calm down') when serving this function (Hatzigeorgiadis *et al*., 2007) although support for this assertion is currently in its infancy.

As with imagery, although it is recommended that athletes should use self-talk types that directly tackle the negative thoughts and emotions experienced (Jones, 2003; Tenenbaum *et al.*, 2008) reference to the stress and coping literature does appear to suggest that there may also be benefits associated with the use of instructional self-talk in serving this function. This is because self-talk could be used as a problem focussed coping strategy, particularly when athletes are presented with situations that they perceive themselves to have control over (Nicholls *et al*., 2005a). Additionally, as with imagery, athletes may also experience more facilitative interpretations of their anxiety with the use of self-talk cues that focus on elevating their levels of self confidence (Neil, Mellalieu, & Hanton, 2006).

Although there is research supporting the use of both imagery and self-talk in serving anxiety control functions, there is evidence to suggest that self-talk may be a more effective strategy for controlling cognitive anxiety than imagery. When the relationship between psychological skills use (relaxation, self-talk and imagery) and anxiety responses in swimmers was examined, results revealed that cognitive anxiety scores were most influenced by relaxation followed by self-talk, then imagery and finally goal setting (Fletcher & Hanton, 2001). The researchers explained the more dominant role that self-talk played in cognitive anxiety control compared to imagery, by citing the work of Goleman (1995) who proposed that worrying cognitions often occur in a verbal rather than visual form. As such, he suggested that verbal strategies may be better employed when experiencing cognitive anxiety to directly combat the negative thoughts associated with it. Despite the stronger relationship observed between self-talk and cognitive anxiety control, than between imagery and cognitive anxiety control, to date there has been no experimental support for the use of self-talk over imagery in serving this function. Furthermore, it is important to consider that whilst cognitive anxiety may be more widely represented verbally it can still include visual elements (Davidson & Schwartz, 1976). As such, there might still be benefits associated with the use of imagery and self-talk together in combating both forms of anxious representation. The rationale for this suggestion is largely based on the matching hypothesis (Davidson & Schwartz, 1976), which suggests that anxiety should be inoculated with strategies that match the form in which it is represented. In addition to these considerations, although there may be a rationale for recommending the use of self-talk over imagery for controlling cognitive anxiety, there is no reason why it would be a more appropriate strategy for controlling somatic anxiety. In fact, the bioinformational theory of emotional imagery (Lang, 1977) would appear to lend more support to the use of imagery than self-talk for serving this function. This is because research has revealed that imagery can be used to manipulate physical anxiety responses (Lang, 1978).

To conclude, the research profiled in this section has presented the functional commonality between imagery and self-talk in serving anxiety control functions. However, it is evident that there is still much ambiguity regarding how the strategies should be used, independently and together, when serving this function. As such, further research is required to ascertain the relative importance of imagery and self-talk in serving anxiety control functions.

2.3.2.3 Elevating motivation

Qualitative studies have revealed that athletes from a variety of sports use imagery (Munroe *et al.*, 2000; Nordin & Cumming, 2005a; White & Hardy, 1998) and self-talk (Hardy *et al.*, 2001a; Hardy *et al.*, 2005a) independently of one another to enhance their levels of motivation. It is posited that MS imagery is the most effective imagery type for increasing motivation (Hall *et al.*, 1998) although it must be noted that athletes have also been found to report the use of a range of imagery types to serve this function (e.g., execution images, body related images and irrelevant images and imagining the ensuing challenge; Nordin & Cumming, 2005a; White & Hardy, 1998). MS imagery typically involves the imagination of specific outcome goals or behaviours (e.g., winning a tournament, the adulation of team mates) (Martin *et al.*, 1999). There has been limited experimental research examining the effect that MS imagery has on athlete levels of motivation although Burnhan *et al.* (1988) did compare the effect that 12 weeks of CS and MS imagery training had on running performance. Results revealed that although MS imagery resulted in improved performance, the effect was no greater than that observed with the use of CS imagery. Moreover, it must be noted that athlete levels of motivation were not directly measured in this study, so it is unclear whether there were any differences between the two strategies in resultant motivation.

Research has revealed that athletes also use self-talk to enhance motivation (Hardy *et al.*, 2001a; Hardy *et al.*, 2005a). Experimental support for the use of self-talk in enhancing motivation remains limited although Hatzigeorgiadis (2006) found that the use of motivational self-talk was perceived as serving greater effort enhancing functions than instructional self-talk. Furthermore, Van Raalte, Cornelius, Brewer, and Hatten (2000) interestingly suggested that overt negative self-talk could also be utilised to increase motivation.

The role of both imagery and self-talk in motivation enhancement remains one of the most under researched functions of both strategies. Furthermore, there appears to be little theoretical support for the suggestion that there may be additive effects associated with the combined use of imagery and self-talk in serving this function. Owing to the limited understanding of how both imagery and self-talk are best used to increase motivation, further research is required before recommendations for their combined use can be formulated.

2.3.3 Functional commonality conclusion

The functional similarities between imagery and self-talk make it appealing to formulate recommendations for their combined usage. However, the research profiled demonstrates that these recommendations may not be as 'straight-forward' as originally proposed (Hardy *et al*., 2001a). This is because there is still incomplete understanding as to how the strategies are 'best used' independently of one another when serving these functions. For example, recent research into both imagery (Short *et al*., 2004) and self-talk (Hatzigeorgiadis *et al*., 2007) revealed that there may be considerable variation in the types of imagery and self-talk used when serving cognitive and motivational functions. Furthermore, there is evidence to suggest that athletes may display preferences for the use of imagery and self-talk over one another, depending on the function being served. As such, although the functional commonality between imagery and self-talk has led to recommendations for their combined usage (Hardy *et al*., 2001a), there are a number of factors that warrant consideration before they can be accepted with confidence.

2.4 Contextual and temporal aspects

The previous section of this review outlined the functional similarities between imagery and self-talk and considered evidence for and against the combined use of the strategies. It also provided initial evidence for the impact of context on the functions served by imagery and self-talk. This section will consider in detail the role that contextual factors play in the use of imagery followed by self-talk.

It is widely accepted that the functions that imagery serve are largely influenced by the nature of the situations that athletes are presented with (Fournier *et al.*, 2008; Martin *et al*., 1999; Munroe *et al.*, 2000). Early research revealed that athletes reported the use of imagery more in association with competition than practice (Barr & Hall, 1992; Hall *et al.*, 1990; Salmon *et al.*, 1994), making more use of the strategy pre-competition rather than during or afterwards (Barr & Hall, 1992; Hall *et al.*, 1990; Munroe *et al.*, 2000; Salmon *et al.*, 1994; Weinberg *et al.*, 2003). In contrast, when athletes reported their use of imagery in relation to practice, they emphasised its use more during practice rather than before or after (Hall *et al.*, 1990; Salmon *et al*., 1994; Weinberg *et al.*, 2003). Based on these findings, it was proposed that athletes used imagery prior to competition as a performance enhancement strategy, whilst using it more during practice to facilitate the learning and execution of skills (Hall *et* *al*., 1990). Although these suggestions were intuitively appealing, they were largely unfounded as the research conducted had not directly assessed what the functions of imagery were at these different time points.

The last fifteen years has seen a greater understanding about the role that contextual factors play in the use of imagery (Fournier *et al*., 2008; Martin *et al*., 1999; Munroe *et al*., 2000; Nordin & Cumming, 2005a). Early proposals suggested that the situation that athletes were presented with determined the types of imagery that they used and, as a result, the functions that these imagery types served (Martin *et al*., 1999; Munroe *et al*., 2000). Martin *et al*. (1999) theorised that it was likely that athletes would use CS imagery widely during practice to learn new skills whilst using MG-M imagery more prior to competition to increase confidence. Munroe *et al*. (2000) conducted a study which sought to clarify how athletes used different types of imagery (treated synonymously with imagery functions) in different situations (Martin *et al*., 1999), whilst also exploring how the content (nature, perspective and senses) of their images varied. The study examined ‘where, when, what and why’ athletes used imagery. Data were collected via interviews with 14 athletes from a variety of university sports teams. Upon completion of data collection, data were content analysed and key themes were created. In addition, frequency counts were undertaken to determine how frequently different types of imagery were used during and outside of training, and pre, during and post competition.

In support of the proposals by Martin *et al*. (1999), findings revealed that athletes used CS imagery most widely during training to aid the technical development of skills. However in contrast, the use of MG-M imagery to enhance confidence was more widely reported during training as opposed to pre-competition. In addition, findings revealed that athletes employed the use of kinaesthetic imagery most during training, and positive imagery most prior to competition.

It is possible that the athletes used kinaesthetic imagery widely during training to aid the learning and execution of skills, but used positive imagery most pre-competition to optimise their competitive emotional state. Although this would appear to be a logical explanation it is based on conjecture as the relationship between imagery content and function was not examined. Instead these constructs were presented as unrelated entities. This could be considered a weakness of the research. Additionally, whilst the findings by Munroe *et al*. (2000) acknowledged the role that contextual factors played in imagery use, they are now considered outdated as they presented imagery type and function as one and the same (Nordin & Cumming, 2005a). This is a somewhat simplistic approach given that the preceding sections of the review have demonstrated that imagery type and function are not akin to one another.

Later research overcame these issues and it is now suggested that athletes' use of imagery is influenced by a three way interaction between the situation, function and content (Fournier *et al*., 2008; Nordin & Cumming, 2005a). To illustrate this interaction, Nordin and Cumming (2005a) demonstrated that dancers reported imagining what they wanted to achieve (content) before practice and performance (situation), to both plan their routine and reduce any anxious thoughts and distractions that they were experiencing (functions). Whilst these findings illustrate the interaction between the three elements, Fournier *et al*. (2008) provided a more prescriptive model of imagery that presented situational factors as the key determinant of imagery function, which in turn influence imagery content and characteristics. See figure 2.2 for a visual representation of this model.

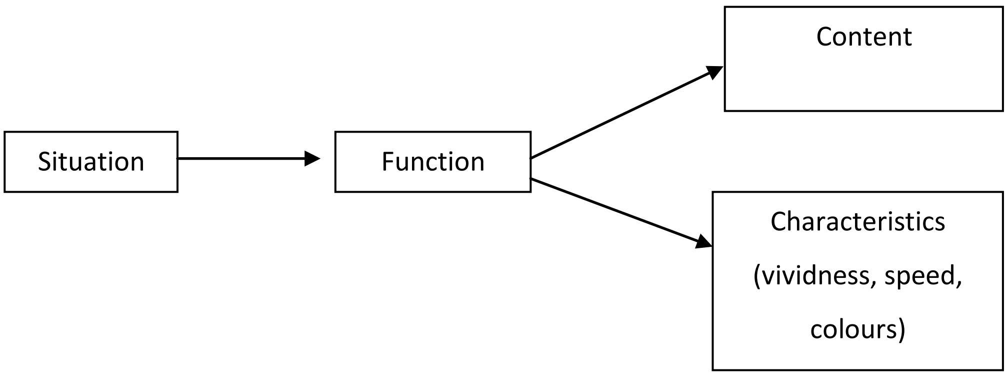


Figure 2.2: Model of imagery use (Fournier *et al.*, 2008, p. 747)

Fournier *et al*. (2008) provided initial evidence to support this model when they examined skydivers' use of imagery. They found that skydivers used imagery to serve different functions at different stages of the skydive (Fournier *et al*., 2008). For example, when the skydivers were practising a routine on a skateboard, before jumping, they reported using imagery to learn movements. In contrast, five minutes before the jump, skydivers reported using imagery to increase their focus and reduce anxious thoughts. These findings specifically lend credence to the influential role that situational factors play in the functions served by imagery.

Fournier *et al*. (2008) presented further evidence to support the next phase of their model, which proposed that the functions served by imagery influence how the strategy is represented; the content (perspective) and characteristics (vividness, colour, speed). This influence was confirmed when the skydivers reported employing the use of slow paced images from an internal perspective when using the strategy to correct skills. However, when using imagery to manage stress, the skydivers reported employing the use of faster paced images. It is likely, that athletes use slower images when correcting skills because they are using the strategy to modify highly intricate aspects of a skill. Furthermore, an internal perspective may be preferential when serving this function, because athletes might be looking to re-create and modify changes in the visual field associated with the production of the skill (White & Hardy, 1995).

Although there is increasing understanding of the role that contextual factors play in imagery use, it is important to acknowledge that many of the existing imagery interventions are designed for use outside of competition (Callow *et al.*, 2001; Mellalieu *et al*., 2009; Munroe *et al.*, 2005). It is likely that the emphasis placed on the use of structured pre competitive imagery scripts has derived from the descriptive research that identified that athletes most widely reported the use of imagery prior to competition. However, although athletes may emphasise the use of imagery prior to competition, research has found that they also make use of it during competition at specific time points (Bernier & Fournier, 2010). For example, Weinberg *et al*. (2003) found that athletes value the use of imagery in stressful competitive situations. As a consequence, they suggested that there may need to be a movement away from the practice of routine imagery scripts before competition. This is because the varying nature of the stressful situations makes it difficult to pre-empt what should be included in them (Weinberg *et al.* 2003).

Although research into the role that contextual factors play in imagery use has been much more extensive than self-talk, there is now a framework for self-talk which considers this influence (Hardy *et al*., 2010). See figure 2.3.

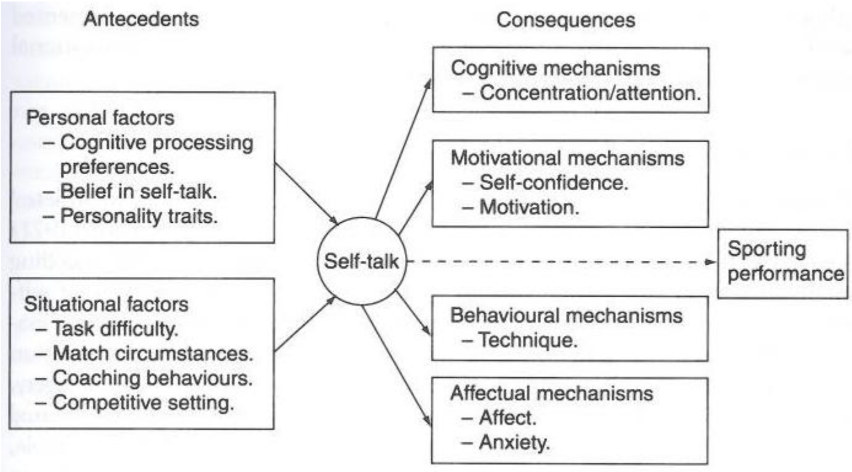


Figure 2.3: A framework for the study of self-talk (Hardy *et al*., 2010)

Although this recent theoretical framework could be subject to criticism because it, in contrast to recent models of imagery (Fournier *et al*., 2008), considers the functions of self-talk as consequences rather than potential determinants of how the strategy is used, it does acknowledge the role that contextual factors play. Despite this acknowledgement, it is important to consider that this framework has been subject to little empirical testing. However, existing research can be drawn upon to support the influential role that contextual factors play in athletes' use of self-talk. For example, Van Raalte *et al*. (2000) found that the competitive situations that tennis players were presented with influenced the way in which they represented their self-talk. More specifically, the winning of a point led to the use of positive self-talk, whilst the ball going out of play led to the increased use of instructional self-talk. In addition, Hardy *et al*. (2004) found that collegiate athletes used self-talk more widely during the competitive season than pre-season. This would appear to imply a greater situational demand which warranted the use of the strategy.

Although existing theoretical models of imagery (Fournier *et al*., 2008) and self-talk (Hardy *et al*., 2010) consider the influential role that contextual factors play in the use of the strategies independently of each other, there is evidence to suggest that particular situational demands might result in the formation of preferences for the use of one strategy over the other. For example, although imagery is more widely applied as a pre-competitive strategy, research into self-talk has revealed that athletes report its use more extensively during competition (Gammage *et al*., 2001; Hardy *et al*., 2001a; Hardy *et al*., 2005a). It has been proposed that the ease and effortlessness of self-talk as a strategy, compared with imagery, may explain why it is more widely associated with use during competition and time restricted situations (Hardy *et al.*, 2005a). These fundamental contextual differences in how the strategies are applied could have implications for their combined usage. For example, if imagery and self-talk are used more effectively at different times how can they be used in combination?

2.5 Processing

The preceding sections of this review of literature presented the functional commonality between imagery and self-talk and the role that contextual factors play in their use. Whilst these sections demonstrated evidence for the combined use of imagery and self-talk, they also raised several issues that could affect athletes' effective use of the strategies together. This has made it difficult to form clear conclusions about how the strategies should be used. Additionally, the evidence presented thus far has failed to provide insight into the mechanistic connections between the strategies. For example, arguments in favour of the combined use of the strategies, based on the functional similarities, are presented only because they serve in doing the same things. At this stage it is important to consider the mechanistic connections between imagery and self-talk because they provide one of the most persuasive cases for the combined use of the strategies. As such, the following section will provide some insight into the mechanistic connections between imagery and self-talk.

Understanding of the mechanistic connections between imagery and self-talk can be gained by consulting the literature on learning (Annett, 1996; Bandura, 1986) and processing (Paivio, 1971, 1986). Both the multiprocess analysis of observational learning (Bandura, 1986) and the Action Language Imagination (ALI; Annett, 1993; 1996) theories, propose that imagery and verbal instructions are central to, and connected, in the learning and execution of movements.

Although visual and verbal processes are considered in the multiprocess analysis of observational learning theory (Bandura, 1986), the ALI model of learning provides the most comprehensive overview of the role of, and interplay between, imagery and self-talk in skill learning and acquisition. Figure 2.4 illustrates the ALI model (Annett, 1996). The ALI model simply proposes that, when learning motor skills, learners have two possible ways in which information can be provided to them; either as demonstrations or verbal instruction. Once this information has been received by the learner, it is processed in a language and/or action channel. When a learner uses only one channel to process the acquired information the result is simple imitation (e.g., physically copying a demonstrated movement, or, repeating a word). However, when both channels are used the outcome is the transformation of verbal instructions into actions, or, demonstrations into verbal descriptions. In order for these transformations to occur the link between the two channels, which is referred to as the action language imagination bridge, is activated. This bridge in essence works in creating visual mental representations of verbal instructions or physical demonstrations so that they can be transformed into physical actions and verbal descriptions respectively. This model appears to suggest that verbal cues can be used to invoke visual images, which can in turn be used to facilitate the execution of skills. This indicates that imagery and self-talk are intrinsically linked in the learning and recall of skills.

Support for the ALI model, and evidence for the interplay between imagery and self-talk, was provided when Hall *et al.* (1997) conducted a between groups study that examined the effect that imagery, verbal self-statements and a combination of the two, had on the recall of movements that were visually demonstrated or guided (without vision). Eighty undergraduate university students (40 men and 40 women) were recruited and randomly placed into one of eight experimental groups. All participants were presented with a series of twelve movement patterns and depending on the group that they were placed in, these movement patterns were presented either as demonstrated guided movement patterns (whilst they were blind folded) or visual demonstrations. Fifteen seconds were left between the presentation of each movement pattern. Within this time period, depending on the experimental group that the participants had been placed in, they were asked to use one of the following: no strategy, imagery in isolation, self-talk in isolation or imagery and self-talk in combination, to aid the retention of the movement pattern. After the presentation of all twelve movement patterns, participants were then asked to leave the room for ten minutes, do a word puzzle and then return to the room to see how many of the movement patterns they could recall in the correct order on a pantograph. Differences in the accuracy of recall were then compared between the eight groups. Results revealed that the 'demonstration combined imagery and self-talk' group recalled the most movement patterns out of the all the groups. It was concluded that this finding supported the ALI model, as it was proposed that the participants in this group had used verbal labels to invoke the necessary images to produce the correct actions. Although this explanation is intuitively appealing, care must be applied in accepting it, as the sequential use of imagery and self-talk when used together was not assessed. Furthermore, Paivio (1986) previously suggested that both verbal and imaginal strategies could be used to invoke each other.

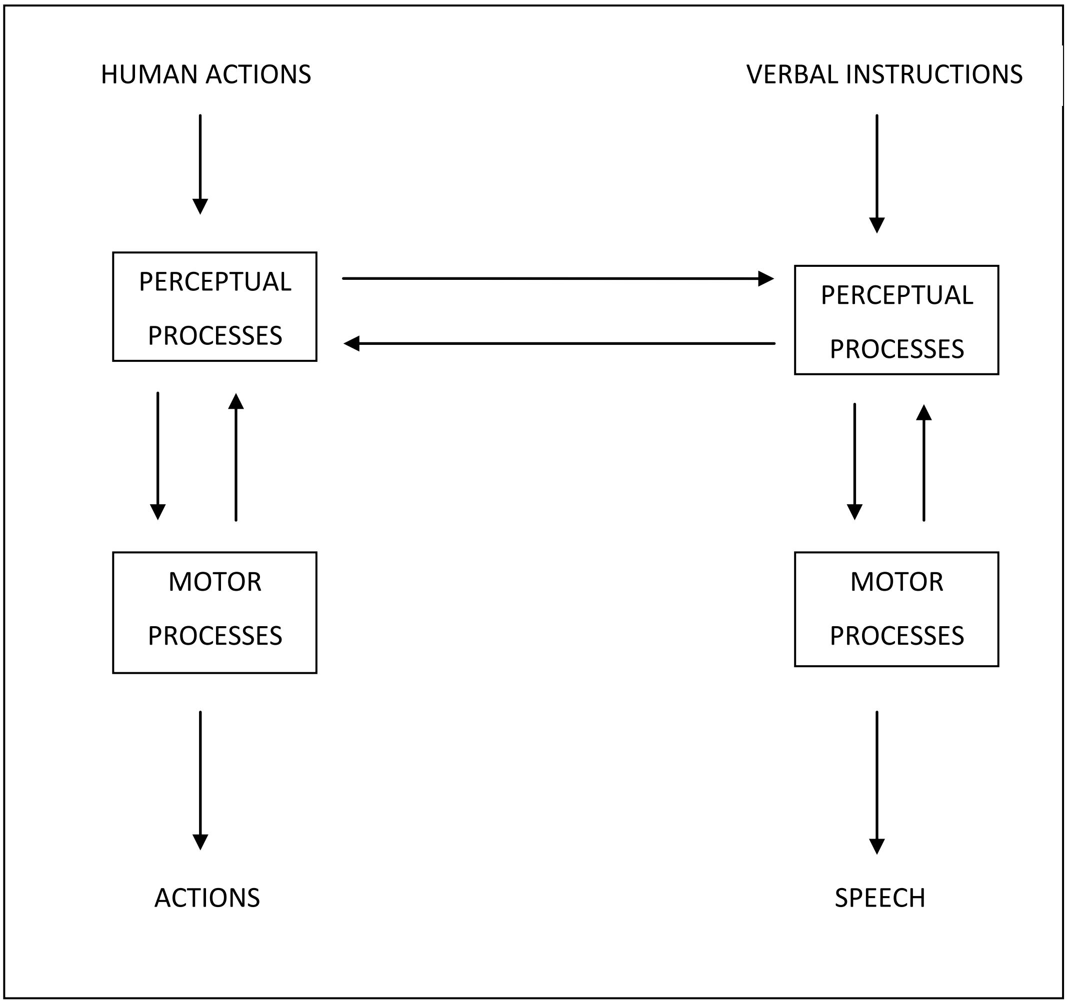


Figure 2.4: Action language imagination model (Annett, 1996, pp66)

Although there appear to be obvious benefits associated with the use of combined imagery and self-talk in the learning and recall of skills, the dual coding theory further proposes that non-verbal and verbal processing systems, which can encapsulate imagery and self-talk respectively, are central to serving a wider range of evaluative, mnemonic, motivational and emotional functions (Paivio, 1986). The dual coding theory was first proposed by Paivio in 1971 and explains the structures and functions of the verbal and non-verbal systems, and how they are involved in the processing of information from stimulus to response (Paivio, 1986). Figure 2.5 illustrates the verbal and non-verbal representational systems (Paivio, 1986).

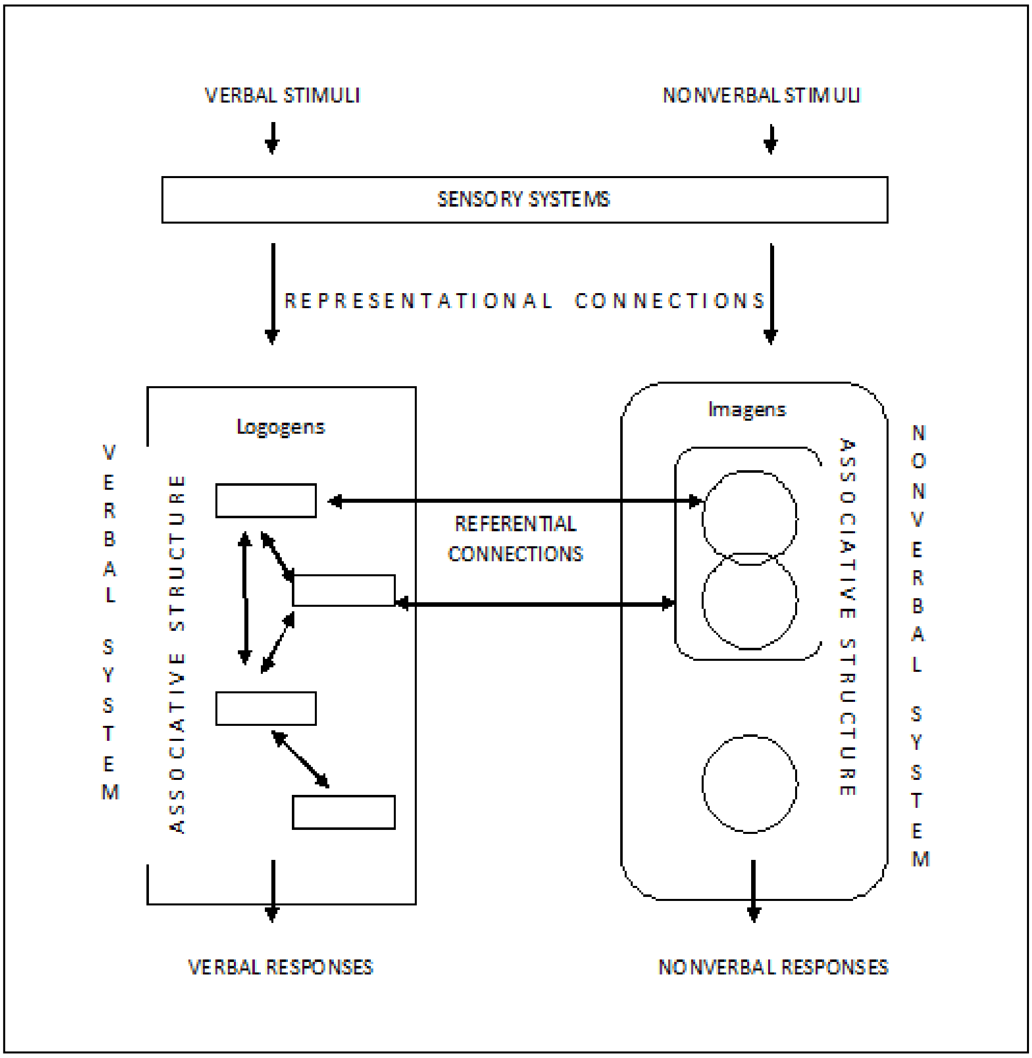


Figure 2.5: Dual coding model (Paivio, 1986, pp67)

Figure 2.5 clearly displays that information can be presented both verbally or non-verbally. This information is then processed in either the verbal and/or non-verbal channels so that verbal and nonverbal responses can be initiated. The non-verbal channel is responsible for processing and representing visual information, whilst the verbal system is responsible for the processing and representation of verbal information.

Paivio (1986) proposed that the two channels differed in the way in which their representational units were organised. He referred to the representational units in the non-verbal channel as imagens, and the representational units in the verbal channel as logogens. It was proposed that the imagens in the non-verbal channel were organised in much the same way that natural objects are grouped. To illustrate this, non-verbal units are often organised in a manner that shows how different elements link together e.g., a body. In contrast, it was suggested that logogens were organised in a sequential fashion e.g., syllables into words.

Although it is important to understand the structures of the two processing systems it is of more relevance to understand how they are used to process information. Paivio (1986) argued that information can be processed in the verbal and non-verbal channels in three ways; representational, referential and associative processing. Representational processing refers to activity that is restricted to just one channel. An example of this form of processing would be imitation. Associative processing is again confined to one channel however it is more advanced than simple imitation. It occurs when representational units invoke other representational units within the same channel. An example of this would be the image of a hockey stick invoking the creation of an image of a hockey ball as a result of its association. Referential processing refers to the processing that occurs across two channels with the suggestion that activity in one system can initiate activity in the other. An example of this would be a verbal stimulus being processed in the non-verbal channel and vice versa e.g., naming an object.

Whilst the verbal and non-verbal channels can be used to process information independently, it has been suggested that there may be additive effects associated with the use of the two systems together (Paivio, 1991). Evidence to support this proposal was found when research revealed that the engagement of both systems led to the greater retention of information compared to when just one was used (Paivio, 1975; Paivio & Csapo, 1973). Additionally, Paivio (1986) provided insight into how the two channels could be used alongside one another to serve evaluative functions. Examples of evaluative functions include making comparisons about the properties of objects with other objects and estimating distances. It was suggested that the verbal system could be used to invoke images and manipulate them where necessary. The use of the systems in this way is of particular relevance to how imagery and self-talk might be used in sporting scenarios, as evaluation is central to the learning and execution of skills and strategies. More specifically, it is of intuitive appeal to suggest that there may be benefits associated with the use of self-talk in manipulating images when learning and executing skills and strategies.

Both the ALI (Annett, 1993) and dual coding models (Paivio, 1986) propose that visual and verbal processes are central to the learning and processing of information, respectively, and are naturally connected to one another. There is evidence of the natural connection between imagery and self-talk in sport with athletes widely reporting the use of self-talk in combination with visualisation, over self-talk in isolation, to facilitate the learning and 'fine tuning' of skills (Hardy *et al.*, 2004). Given this natural connection, it is of little surprise that there have been recommendations for the combined use of the strategies (Hardy *et al.*, 2001a; Kendall, Hrycaiko, Martin & Kendall 1990) and suggestions that self-talk can be used to; a) enhance the quality of the imagery experienced, and direct attentional focus during imagery usage (Kendall *et al.*, 1990), and b) induce (Annett, 1993), manipulate (Paivio, 1986) and correct images (Cumming *et al.*, 2006).

Based on the theoretical and experimental evidence presented, it is of intuitive appeal to suggest that imagery and self-talk should be used together as a unitary psychological strategy. However, the supporting research has not considered how individual differences and contextual factors may affect preferences for, and effectiveness of, use. Section 2.4 presented a body of evidence supporting the notion that contextual factors are the predominant determinant of imagery (Fournier *et al*., 2008; Martin *et al*., 1999) and self-talk use (Hardy *et al*., 2005a). Of more relevance, Hardy *et al*. (2005a) eluded to the suggestion that imagery and self-talk may lend themselves better to different situational demands. This is compounded further by suggestions by Bandura (1986) that the visual representational system might be more effective than the verbal system when retaining skills dependent on temporal and spatial patterns, e.g., a golf swing. In contrast, he suggested that verbal instructions would be more effective in facilitating the retention of complex and intricate information, e.g., a complex strategy. These suggestions directly contrast with the notion that the strategies should always be used together.

Additionally, although many models of imagery present contextual factors as the primary determinant of the use of the strategy (Fournier *et al*., 2008; Martin *et al*., 1999; Munroe *et al*., 2000), the framework for the study of self-talk (Hardy *et al*., 2010) also considers individual differences, such as preferred cognitive style, as an antecedent of self-talk and imagery use. The role that preferred cognitive style plays in imagery and self-talk use is of particular relevance as it has been suggested that some individuals may have a propensity for visual processing (e.g. some people may have a preference for processing visual information (visualisers) and others may prefer processing verbal information (verbalisers; Fogarty &

Burton, 1996). Furthermore, it is widely suggested that athletes are more likely to make use of strategies that they feel more comfortable with (Hall *et al.*, 1990). Therefore, it might be possible that those with a preference for verbal processing may be more likely to make use of self-talk, whilst those with a preference for visual processing may be more likely to make use of imagery (Hardy *et al.*, 2005; Martin *et al.*, 1999). In order to ensure the effective adoption of both imagery and self-talk, it is necessary to identify whether individual processing preferences affect use.

Once again although there is evidence supporting the natural connections between imagery and self-talk, and their additive effects in facilitating the learning and execution of skills, it is apparent that there is still ambiguity regarding their ‘best use.’ This is in part due to the suggestions that the strategies may lend themselves better to different tasks, and, that individual differences may result in preferences for the use of one strategy over the other. This conflict makes recommendations for the use of imagery and self-talk difficult to formulate.

2.6 Existing research on imagery and self-talk use in golf

Thus far, the review of literature has appraised the factors influencing the use of imagery and self-talk in sport in general. However, less research has examined these factors in golf specifically. The purpose of the following section of the review is to provide an overview of the existing research on imagery and self-talk in golf.

Extensive research supports the importance of psychological factors in golf (Hayslip, Petrie, MacIntire, & Jones, 2010; Hellström, 2009; McCaffrey & Orlick, 1989; Thomas & Over, 1994) with imagery consistently being identified as a psychological strategy associated with skilled golfing performance (Hayslip *et al*., 2010; McCaffrey & Orlick, 1989; Thomas & Over, 1994). Given this positive association it is of little surprise that recent studies have specifically examined golfers’ use of imagery (Bernier & Fournier, 2010; Gregg & Hall, 2006). Findings have typically revealed that golfers use imagery to enhance focus, prepare the strategic and tactical aspects of shots, evaluate shots, learn and perfect golf swings and manage psychological states (Bernier & Fournier, 2010; Gregg & Hall, 2006). Although research into golfers' use of self-talk in comparison has received less attention, its use has been identified as a differentiating factor between skilled and less skilled golfers, with skilled golfers using it more widely (Hayslip *et al*., 2010).

Whilst imagery and self-talk use is associated with skilled golf performance, much of the research into the strategies has tended to focus on their use within the pre-shot routine period. Golfers widely emphasise the use of imagery and self-talk within their pre-shot routines along with other behavioural strategies (e.g., waggle, practice swing; Cotterill *et al*., 2010; Crews & Boutcher, 1986). It has been suggested that pre-shot routines, which include the use of imagery and self-talk, should be employed prior to the execution of every golf stroke in order for performance gains to be experienced (Boutcher & Rotella, 1987). Despite these claims evidence supporting this approach is limited (Cohn *et al*., 1990; Hellstrὂm, 2009). Moreover, it has been suggested that task difficulty might influence the use and effectiveness of pre-shot routines (Hellstrὂm, 2009). Evidence to support these claims has been found with research revealing that golfers employ longer pre-shot routines (Crews & Boutcher, 1986a) and more imagery (Bernier & Fournier, 2010) prior to the execution of shorter shots. It has been argued that this may be because these shots are more difficult and require greater accuracy (Hellstrὂm, 2009). As such, it might be possible that greater performance gains are experienced when golfers use pre-shot routines, which include imagery and self-talk, when they are executing more difficult shots. Beauchamp *et al*. (1996) found support for this suggestion when they found that the use of a pre-shot putting routine resulted in improved performance compared to a control group.

Similarly to Beauchamp *et al*. (1996) a number of studies have examined the influence of imagery and self-talk, independently of each other, on the performance of specific golf strokes including; putting (Harvey *et al*., 2000; Ramsey *et al*., 2008; Short *et al*., 2002; Smith & Holmes, 2004; Taylor & Shaw, 2001; Woolfolk *et al*., 1985b), pitching (Bell & Hardy, 2009) and bunker shots (Smith *et al*., 2008). An issue with much of the research into the effect of imagery on putting specifically (Ramsey *et al*., 2008; Short *et al*., 2002; Woolfolk *et al*., 1985b), has been that novices have often been recruited rather than skilled golfers. It is evident that these studies have used putting only as a closed skill through which to examine the effect of imagery. However, the recruitment of such participants makes the application of findings to skilled golfers untenable.

Aside from this issue the studies profiled have typically examined the effect of positive and negative imagery (Taylor & Shaw, 2001) and self-talk (Harvey *et al*., 2000) on putting performance. Findings from these studies have revealed that the use of negative imagery (Taylor & Shaw, 2001) and self-talk (Harvey *et al*., 2000) leads to degradations in putting performance. However, the influence of positive imagery and self-talk is less clear with some studies finding no performance improvements (Harvey *et al*., 2000; Taylor & Shaw, 2001) and others finding positive effects (Woolfolk *et al*., 1985b).

Whilst there has been a plethora of research examining the influence of positive and negative imagery, and to a lesser extent self-talk, on putting performance, research conducted over the course of the last decade has started to examine the influence of PETTLEP imagery on putting (Smith & Holmes, 2004) and bunker shot performance (Smith *et al*. 2008). Although this research is in its infancy findings have indicated that PETTLEP imagery, which replicates real life as closely as possible, results in the improved execution of golf strokes (Smith & Holmes, 2004; Smith *et al*., 2008).

In addition to the recent PETTLEP work, research into self-talk specifically has examined how different attentional self-talk cues influence pitching performance (Bell & Hardy, 2009). A group of 33 skilled golfers (Handicap = 9.4) were allocated to one of three self-talk groups adopting different attentional self-talk cues (proximal external, distal external, internal) prior to the performance of a pitching task. Results revealed that golfers experienced the greatest performance gains when using distal external self-talk cues. It was concluded that this form of self-talk allowed for the natural control mechanisms to be used which is of benefit to performance.

Whilst extensive research has examined how imagery and self-talk are used by golfers prior to the execution of specific golf strokes, there is limited understanding about how the strategies are 'best used' outside of this time frame. This is concerning given that the 'thinking time' associated with the walk between golf strokes can lead to the occurrence of stress appraisals (Nicholls *et al.*, 2005a). Owing to the walking period being a potentially problematic time for golfers it has been suggested that golfers should look to develop consistent between shot routines to direct attention away from the next golf stroke (Boutcher & Rotella, 1987). It is feasible that imagery and self-talk could be used to serve this function as existing research has revealed that golfers do employ the use of the strategies to cope with the presentation of stressors (Giacobbi *et al*., 2004; Nicholls *et al*., 2005a & b; Nicholls & Polman, 2008). In further support, research by Thomas and Fogarty (1997) revealed that imagery and self-talk training led to reductions in negative emotions and cognitions in golfers.

To conclude, the purpose of this section of the review was to provide a synopsis of the research that has been conducted on imagery and self-talk in golf specifically. The appraisal of the literature demonstrates that much of the research on imagery and self-talk in golf has tended to focus on their effect on the learning and execution of skills. Whilst this has been insightful it is evident that there have been no investigations into the combined use of imagery and self-talk in golf, and limited research into how the strategies are used to serve other functions. Additionally, because the research to date has largely examined the effect of imagery and self-talk independently of each other, there is little understanding of the preferences that the golfers might have for the use of one strategy rather than the other. Another criticism of the existing research has been that many of the studies have recruited novice participants, rather than skilled golfers, consequently making the application of findings difficult to determine. A final limitation of the research has been that the use, and effectiveness, of imagery and self-talk has only been ascertained within the pre-shot routine period. This is of concern as the majority of a round of golf is spent walking between shots.

2.7 Conclusion

Understanding of how imagery and self-talk should be used to facilitate performance in sport is currently under researched. In accordance with the multi-strategy approach to psychological skills training (Hanton & Jones, 1999b; Rogerson & Hrycaiko, 2002; Thomas, Hanton, & Maynard, 2007), it is of intuitive appeal to recommend that imagery and self-talk, as functionally similar and theoretically connected strategies, should be used in combination. However, when the potential influences of task demands, situational factors, individual differences and functional requirements on usage are considered, these recommendations become more complex than originally thought. This review appraised the existing research that has considered how these factors influence the use and effectiveness of imagery and self-talk, independently and in combination, in sport. Within each section of the review, relevant theory was drawn upon to support arguments for and against the combined use of the imagery and self-talk. Furthermore, future avenues for research were highlighted.

The ability of both imagery and self-talk to facilitate the learning and execution of skills and strategies, enhance confidence and motivation and control anxiety has led to suggestions that there may be additive effects associated with the combined use of the strategies in serving these functions (Hardy *et al*., 2001a). However, whilst these suggestions are intuitively appealing a thorough appraisal of the literature revealed that they are based on limited empirical support. Moreover, it became apparent that there was a stronger rationale for the combined use of imagery and self-talk in serving some functions than others. For example, the most persuasive argument for the combined use of imagery and self-talk in the literature was in the facilitation of the learning and execution of skills. This is largely because there was extensive theoretical (Annett, 1993; Banduara, 1986; Paivio, 1986) and empirical (Hall *et al.,* 1997) support for the combined use of the strategies in serving this function, with suggestions that self-talk could be used to initiate imagery (Annett, 1993) and subsequently direct and manipulate it (Paivio, 1986).

Additionally, theoretical support was also provided for the additive effects associated with the combined use of imagery and self-talk in controlling cognitive anxiety and enhancing self efficacy. For example, although it is acknowledged that cognitive anxiety is predominantly represented as negative verbalisations, and that self-talk may therefore be a more appropriate strategy to combat these (Fletcher & Hanton, 2001), it is accepted that negative images can also be a symptom of cognitive anxiety (Morris, Davis, & Hutchings, 1981). As such, in accordance with the matching hypothesis (Davidson & Schwartz, 1976), it was concluded that there was a rationale for the suggestion that there might be additive effects associated with the use of imagery and self-talk together in tackling both modes of representation. Additionally, Bandura’s theory of self efficacy (1986) was drawn upon to provide support for the suggestion that greater increases in self efficacy could be experienced with the use of both imagery and self-talk together.

At this point it is important to acknowledge that whilst relevant theory was considered to present a rationale for the combined use of imagery and self-talk in serving these functions, there was no empirical evidence to support them. Moreover, the review of literature revealed that for some of the functions there was little theoretical support for why the combined use of imagery and self-talk would be beneficial. For example, there appears to be no rationale as to why there would be additive effects associated with the combined use of imagery and self-talk in elevating motivation, other than that they work in serving the same function. Additionally, the appraisal of the literature led to suggestions that for some of the functional requirements the use of one strategy over the other may be preferable. For example, consultation of the bioinformational theory of emotional imagery (Lang, 1977) indicated that there was a stronger rationale for the use of imagery over self-talk in controlling somatic anxiety. This is because the bioinformational theory of emotional imagery suggests that imagining emotional responses can result in them physically occurring. Therefore, there are suggestions that athletes can use imagery to control physically experienced anxiety symptoms (Cumming *et al*., 2007). To the author's knowledge, there is no research supporting the use of self-talk in serving this function. All of these considerations together demonstrate that it is not as straight forward as to suggest that imagery and self-talk should always be used in combination to serve a range of functions.

The ambiguity associated with the use of imagery and self-talk in serving a variety of functions was compounded further by the role that contextual factors have been found to play in athletes' use of the strategies. Theories of both imagery (Fournier *et al*., 2008) and self-talk (Hardy *et al*., 2010) suggest that the situation with which an athlete is presented is the predominant determinant of how they use the strategies. The existing literature appears to suggest that self-talk may lend itself better to time restricted situations than imagery, as it is a quicker and more efficient strategy (Hardy *et al.*, 2005a). This again provides opposition to the notion that imagery and self-talk should always be used together, and again confuses the formulation of recommendations for their usage.

Finally, in addition to appraising the role that external factors played in athletes' use of imagery and self-talk, the influence of individual differences was considered. In particular, the role of preferred cognitive style in athletes' use of imagery and self-talk was presented as a factor that might cause preferences for the use of one strategy over the other being formed (Thomas & Fogarty, 1997).

The appraisal of the literature indicated that there was limited, and at times contradictory, understanding about how imagery and self-talk should be used in sport in general. This was compounded further by the dearth of research into the use of imagery and self-talk in golf specifically. This thesis aimed to take the first steps towards addressing this under researched area by identifying the factors influencing the use, and effectiveness, of imagery and self-talk in golf specifically. Four studies were undertaken to address the research question. The first three studies profiled the factors influencing golfers' existing practice of imagery and self-talk, whilst the final study ascertained the performance effects associated with golfers' usage of an imagery and self-talk intervention that was developed in consideration of the predominant factors found to influence the use of the strategies in the previous three studies.

This profiling-followed-by-intervention approach was adopted for several reasons. Firstly, given the limited existing research on the factors influencing golfers' usage, and preferences for imagery and self-talk, it was necessary to identify these key determinants to add direction and rationale to the development of future interventions. The process of observing a phenomenon before intervening is a commonly adopted approach in psychological research (Field & Hole, 2003). Hardy *et al*. (2010) reiterates the importance of understanding the personal and situational factors that influence self-talk use, suggesting that these can be of practical importance. Similar sentiments have been echoed in research into imagery, with Munroe *et al*. (2000) proposing that findings from their descriptive research could act as a rationale for future research and the development of interventions.

In conclusion, the purpose of the following studies in this thesis was to:-

- Identify how preferred cognitive style impacted upon golfers' use of imagery and self-talk in practice and competition.
- Determine how imagery and self-talk were used in combination and isolation in golf.
- Identify the common characteristics of the competitive situations where golfers emphasised the use of imagery and self-talk.
- Determine how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediately prior to the execution of golf strokes under stressful conditions.
- Ascertain the effectiveness of a problem focussed imagery and self-talk package on the execution of golf strokes under stressful competitive conditions.

3. Study 1: The impact of preferred cognitive style on imagery and self-talk use in golfers.

3.1 Introduction

The functional commonality (Gammage *et al.*, 2001; Hall *et al.*, 1998: Hardy *et al.*, 2001a) and theoretical connections (Annett, 1993, 1996; Paivio, 1971, 1986) between imagery and self-talk have led some researchers to propose that there may be additive effects associated with the use of the two strategies together (Hardy *et al.*, 2001a). However, there are arguments that individual differences in preferred cognitive styles may result in athletes demonstrating preferences for the use of imagery and self-talk over one another (Hardy *et al*., 2005a; Martin *et al*., 1999).

Preferred cognitive style refers to the dominant information processing style that a person adopts to perform cognitive tasks, e.g., thinking, problem solving and memory tasks (Green & Schroeder, 1990). It is argued that some individuals may have a stronger preference for receiving, processing and responding to verbal information (verbalisers), others may have a higher preference for adopting visual processing styles (visualisers) and some may display no preference for either mode of processing (Richardson, 1977). The concept of preferred cognitive style was originally presented as a unidimensional construct with it being proposed to range along one continuum from extreme visualiser to extreme verbaliser (Richardson, 1977). However, visual and verbal preferred cognitive styles are now recognised as separate constructs and it is understood that people may actually have a preference for adopting both or neither styles (Antonitti & Giorgetti, 1998; Childers *et al.*, 1985; Fogarty, & Burton, 1996). It has been suggested that an implication of preferred cognitive style might be that some athletes prefer to use imagery over self-talk and vice versa (Hardy *et al.*, 2005a; Martin *et al.*, 1999; Thomas & Fogarty, 1997). Furthermore, it is possible that some athletes may display preferences for the use of both or neither strategies. Previous research has examined how different variables, such as age, sex, skill level and sport type impact upon imagery and self-talk use (Barr, & Hall, 1992; Hall *et al.*, 1990; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a; Hardy *et al*., 2004; Munroe *et al.*, 2000; Weinberg *et al.*, 2003), but little research has examined how preferred cognitive style affects use.

Preferred cognitive style has been explained from a variety of perspectives. For example, it has been proposed that a person's preferred cognitive style, sometimes used interchangeably with the term hemisphericity, is a display of their reliance on one cerebral hemisphere of the brain over the other (Ornstein, 1977; Springer & Deutsch, 1998). The cerebral cortex of the human brain is divided into a right and left hemisphere. The right hemisphere is responsible for non verbal visuospatial tasks whereas the left hemisphere is believed to be responsible for verbal sequential analytical thought (Springer & Deutsch, 1998). In contrast to the hemispheric explanation, it has also been argued that preferred cognitive style may result from a combination of both innate and environmental factors (Paivio, 1986). A relatively recent study acknowledged the effect that the environment might have in the development of a person's preferred cognitive style; it attributed the finding that a higher proportion of young people had a stronger preference for visual processing over verbal processing to the fact that young people are now more widely exposed to visual information (Lighter & Eastman, 2002). Ornstein (1977) also acknowledged the effect of the environment in the development of preferred cognitive style when he argued that people in Western societies are now highly reliant on the left hemisphere of their brains because many of the tasks that they undertake are analytical. In contrast, he argued that those in Eastern societies were more right hemisphere reliant as they engaged in more instinctive tasks. Although these environmental exposure explanations for preferred cognitive style are intuitively appealing, they are largely based on conjecture as exposure to different forms of stimuli was not ascertained. As such, there is limited understanding of the causality of preferred cognitive style. For example, it might be possible that the young people in Lighter and Eastman's study demonstrated a stronger preference for visual processing than verbal processing as a result of their developmental stage. This suggestion however has no academic support as the prevalence of preferred cognitive style in the general population is unknown (Lighter & Eastman, 2002).

Preferred cognitive style differs from cognitive ability in that cognitive ability is an individual's capability to perform a cognitive related task (Green & Schroeder, 1990; Mayer & Massa, 2003). Results have typically been inconclusive regarding the relationship between preferred cognitive style and ability. Some studies have found relationships between a visual preferred cognitive style and imagery ability (O'Halloran & Gauvin, 1994). Others have failed to find relationships between visual and verbal preferred cognitive styles and visual and verbal abilities (Edwards & Wilkins, 1981; Childers *et al.*, 1985). It has been argued that preferred cognitive style and ability are not intrinsically related and that at most there can be no more than an indirect relationship between the two constructs (Richardson, 1983). For example, if a person has a high visual ability this may make them more likely to use visual strategies.

There is a plethora of research acknowledging the importance of preferred cognitive style in both educational (Riding & Al-Salih, 2000) and marketing settings (Childers *et al.*, 1985).

However, the role that it plays in a sporting context is under researched (Thomas & Fogarty, 1997; O'Halloran & Gauvin, 1994). To date only two studies have examined the role that preferred cognitive style plays in the effectiveness of imagery and self-talk training on sports performance (O'Halloran & Gauvin, 1994; Thomas & Fogarty, 1997). This is in spite of calls for research into its examination as it has been suggested that the preferences that people have for particular modes of processing may spill over into their use of matched psychological strategies in sport (Hardy *et al*., 2005a; Martin *et al*., 1999).

Moderate support for the role of preferred cognitive style in the effectiveness of imagery training was found when O'Halloran and Gauvin (1994) recruited 24 participants (based on their extreme preference for either visual (n = 12) or verbal (n = 12) processing). Participants were allocated to either control or experimental groups. All participants completed pre-experimental tests assessing their performance on a simple motor task and their imagery vividness and ability. After these measures had been taken, participants in the experimental groups undertook five days of imagery training whilst those in the control groups did some simple non-imagery related tasks (pursuit rotor, balance board etc.). Re-test results found some support for the influence of preferred cognitive style, when it was revealed that imagery training increased imagery ability in visualisers but not verbalisers, and that visualisers were better able to create kinaesthetic images than verbalisers. In addition, interestingly, both the control and experimental visualisers performed better on the motor skill than the control and experimental verbalisers. It was argued that the control visualiser group improved as well as the experimental visualiser group because they may have naturally been utilising imagery despite having no training as this was their preferred mode of processing. The idea that visualisers were better able to develop their imagery ability provides some support for the importance of preferred cognitive style. It must be noted however that a criticism of the study was that only extreme visualisers and verbalisers were tested despite it being accepted that a number of people may have preferences for both modes of processing. Furthermore, only six participants were allocated to each subgroup which could have resulted in the study being under powered to determine between group differences (Field, 2009).

Contrary to O'Halloran and Gauvin (1994), Thomas and Fogarty (1997) found no support for the role of preferred cognitive style in the effectiveness of imagery and self-talk when they examined the effect that instructional and positive imagery and self-talk training had on visualisers' and verbalisers' golf performance (Thomas & Fogarty, 1997). In order to answer the research question, male and female skilled and unskilled golfers (N = 32) were recruited from two different golf clubs. In the first session, conducted at the golfers' home clubs, all participants completed the purpose designed Your Information Processing Preferences Scale (YIPPS) which identified their preferences for visual and verbal processing. Additionally, baseline measures of handicap, performance on a golf skills test (accuracy for long and short shots) and responses on the Golf Performance Survey (Thomas & Over, 1994) and the SIQ (Hall *et al*., 1998) were taken within this session. To combat a learning effect a cross over design was employed. Following the baseline session participants from one golf club undertook two imagery sessions followed by re-test performance measures, whilst those from the other golf club undertook two self-talk training sessions followed by performance assessments. Upon completion of these assessments participants from both clubs then underwent the psychological skills training and assessments that they had not yet undertaken. Results revealed that very few participants displayed a preference for one mode of processing over the other. Moreover, preferred cognitive style was not found to be influential in the effectiveness of imagery and self-talk training. Results did however reveal that imagery and self-talk training improved performance in all participants, although caution must be applied when considering this finding as the study failed to use a control group.

The research profiled remains inconclusive as to the role of preferred cognitive style on imagery and self-talk effectiveness (O'Halloran & Gauvin, 1994; Thomas & Fogarty, 1997). These contrasting results, however, may have been a consequence of methodological issues and between study differences. Firstly, both studies employed different, relatively unknown, measures of preferred cognitive style. This may have meant that they were potentially making assessments of different constructs. Furthermore, whilst O'Halloran and Gauvin (1994) examined the effect of preferred cognitive style in novices, Thomas and Fogarty (1997) examined its use in expert golfers. There is a possibility that Thomas and Fogarty found no support for preferred cognitive style because the expert golfers who they recruited had already been exposed to different methods of psychological skills training which could have overridden their use of the recommended strategies. Furthermore, they also recruited a mixture of both men and women, and there was no indication that they had been equally distributed across groups. This is of importance as previous research has found gender to be a determinant of imagery and self-talk use and perceived effectiveness (Mahoney *et al*., 1987; Weinberg *et al*., 2003). In addition, it must be noted that Thomas and Fogarty (1997), like O'Halloran and Gauvin (1994), experienced problems with participant numbers, with results being based on the recruitment of only five visualisers. A final important critique of both of the studies profiled was that they failed to create sufficiently distinct processing groups or recognise that there may be gradings in the strength of their processing preferences. This is a necessary consideration as Childers *et al*. (1985) argued that whilst some people may have a strong preference for one processing style rather than the other, others may have a preference for both modes of processing and some for neither.

One of the primary aims of this thesis was to identify the factors influencing golfers' usage of imagery and self-talk. The purpose of this study was to examine how golfers' preferred cognitive style related to their use of imagery and self-talk in practice and competition. A non-experimental questionnaire approach was adopted to answer the research question. In order to overcome some of the earlier limitations associated with the creation of distinct preferred processing groups in previous studies, imagery and self-talk use in golfers with a range of preferred processing styles was examined. Imagery and self-talk use in golfers with strong ('high both') and weak (undifferentiated) preferences for both visual and verbal processing, and golfers with a strong preference for one processing style but weak preference for the other (visualisers and verbalisers) was examined. Finally, golfers' use of imagery and self-talk was determined in both practice and competition as it has been proposed that the use of strategies inconsistent with preferred processing styles may be a function of situational influences (Richardson, 1977). Key hypotheses for the study were:-

- Visualisers and those with a strong preference for both modes of processing would use significantly more imagery than the verbalisers and undifferentiated processors in practice (hypothesis 1) and competition (hypothesis 2).
- Verbalisers and those with a preference for both modes of processing would use significantly more self talk than visualisers and undifferentiated processors in practice (hypothesis 3) and competition (hypothesis 4).

The rationale for these hypotheses stem from suggestions that those with strong preferences for visual processing will be more likely to engage in the use of visual psychological strategies, such as imagery, than those with a low preference for this mode of processing (Martin *et al*., 1999). Hypotheses 3 and 4 are also supported by these principles with suggestions that those with more pronounced preferences for verbal processing will be more likely to engage in the use of verbal psychological strategies, such as self-talk, than those with low preferences for this mode of processing (Hardy *et al*., 2010).

3.2 Method

3.2.1 Design

A 4 x 2 x 2 mixed design varying preferred cognitive style (visualisers, verbalisers, undifferentiated, 'high both'), psychological strategy (imagery & self-talk), context (practice & competition) with the latter two repeated measures, was employed. The dependent variable was amount of usage. This design was employed to determine the role that preferred cognitive style played in golfers' use of imagery and self-talk in practice and competition.

The four distinct preferred processing groups were formed using scores obtained on the Style Of Processing questionnaire (SOP; Childers *et al.*, 1985; Appendix 1). This questionnaire allows for visual and verbal processing preferences, as separate constructs, to be obtained. The method used to allocate participants to one of the four groups was based upon that used by Abma *et al.* (2002) which involved ranking all participants' visual and verbal processing scores in ascending order. Visual and verbal scores that fell in the top 33% of the ranking were then classified as indicating a strong preference for that processing style. Visual preference scores ranged from 12 (strong preference) to 38 (weak preference), verbal preference scores ranged from 13 (strong preference) to 44 (weak preference). As a result of this method, participants who obtained visual scores of 22 or less were classified as having high preference for visual processing and those who scored 24 or less on the verbal scale were classed as having a high preference for verbal processing. The values were then unranked and participants were allocated to one of the four groups. This method allowed for the creation of the two extreme groups but also acknowledged that some athletes may not display preferences for the use of both processing styles.

The dependent variable (usage of the psychological skills) was determined through golfers' scores obtained from the TOPS questionnaire (Thomas *et al.*, 1999). This questionnaire was originally developed as a measure of eight psychological strategies in practice and competition which equated to sixteen subscales. For the purpose of the current investigation, only four subscales of the questionnaire were used (imagery use in competition, imagery use in practice, self-talk use in competition, self-talk use in practice). The use of these subscales allowed for repeated measures on two factors (context, psychological strategy) to be examined. The questionnaire can be located in appendix 2. By using this questionnaire, golfers' use of the strategies could be quantified to enable comparisons between groups to be made.

3.2.2 Participants

Upon gaining ethical approval from the School ethics committee, purposive sampling was undertaken and golfers were recruited from golf clubs and university golf teams in the North East of England. All recruited players had an official handicap and played competitively, competing in at least one golf competition during this study's golf season. Male golfers (n = 188) (mean age = 45.2 ± 15.2), mean handicap = 11.24 ± 15.5) volunteered for the study. Only male golfers were recruited for the current investigation as figures have revealed that just 1% of women in the UK play golf compared to 9% of men (Fox & Rickards, 2002). These figures would have made it difficult to gain access to female golfers to include in this study. A whole range of handicaps were represented in the present study as an initial pilot, assessing the imagery and self-talk use of just 61 semi-skilled golfers (handicap 12 – 18), revealed issues with participant numbers and statistical power.

3.2.3 Measurement instruments

3.2.3.1 Style of processing questionnaire (SOP)

Preferred cognitive style was assessed using the 22 item SOP (Childers *et al.*, 1985). The SOP scale contains 11 items assessing verbal processing preference and 11 items assessing visual processing preference. Six of the items on the SOP questionnaire were taken from the Verbaliser Visualiser questionnaire (VVQ) (Richardson, 1977). Although the VVQ was the most widely used measure of preferred cognitive style in the past, it has been criticised heavily because it contains a number of items that assess ability rather than preference (Childers *et al.*, 1985). The SOP overcomes this issue and seeks only to assess preference.

Although the SOP was originally developed as a single continuum scale with participants gaining a single score classifying them as either a visualiser or verbaliser, the visual and verbal components of the questionnaire can be treated as independent dimensions so that different combinations of processing preferences are obtained (Childers *et al.*, 1985). The SOP scale has alpha coefficient values of 0.81 for the 11 verbal items component and 0.86 for the visual items component (Childers *et al.*, 1985). Although the SOP was initially developed for use in management settings, strong support has been provided for the use of the SOP questionnaire as a measure of preferred cognitive style (Lightner & Eastman, 2002; MacInnis & Price, 1987) and its use has transferred into the psychology domain (Livingston, 2001). The validity of the SOP scale is supported through both its discriminant and criterion validity. Its discriminant validity was confirmed when Childers *et al.* found non significant low correlations between the SOP and two measures of imagery ability; the vividness of visual imagery questionnaire (VVIQ; Marks, 1973) (r = 0.01) and the Gordon test of imagery control questionnaire (VIC; Richardson, 1969) (r = 0.03). The criterion validity of the questionnaire was further confirmed when significant negative correlations between the total SOP score (low total SOP scores represent a preference for verbal processing) and aided recall (r = -0.34) and retention measures (r = -0.31) were found (Childers *et al*, 1985).

Each of the SOP questionnaire items are answered on a 4 point Likert scale (Always true = 1; Usually true = 2; Usually false = 3; Always false = 4). The SOP provides participants with both a verbal and visual preference score. Example items from the visual and verbal subscales respectively are ‘my thinking often consists of mental “pictures” or images’ and ‘I enjoy doing work that requires the use of words.’ Each participant’s score for level of visual and verbal preference was calculated by adding all the responses from the relevant subscales; the lower the score, the stronger the processing preference for that style. Possible scores for each subscale ranged from 11 – 44. If participants missed a maximum of one item on either the visual or verbal processing scale, the rounded mean from the remaining items was used to replace the missing item. If participants had missed more than one item per subscale, their data was withdrawn from the analysis.

3.2.3.2 Test of performance strategies questionnaire (TOPS)

The 64 item TOPS (Thomas *et al.*, 1999) contains 16 subscales assessing the level of usage of eight psychological strategies (activation, relaxation, imagery, goal setting, self-talk, automacity, emotional control and negative thinking/attentional control) in practice and competition. Each subscale consists of 4 items and participants respond to each item on a 5 point likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). A total score for each subsection is acquired by adding all scores in that subsection together. Possible scores for each subscale range from between 4 – 20. For the purpose of the present study, four subscales of the TOPS questionnaire were issued to participants to establish the amount of imagery and self-talk that they used in competition and practice. In total, 16 items were completed by participants. Although the TOPS questionnaire is relatively new, satisfactory alpha cronbach’s coefficient values have been reported in both practice (imagery subscale =

0.73; self-talk = 0.72) and competition (imagery subscale=0.76; self-talk=0.79) and Thomas *et al.* (1999) stated that initial investigations supported the factorial validity of the TOPS.

3.2.4 Procedure

Competitive golf players were recruited at local golf clubs in the North East of England on weekend competition days. If participants agreed to be involved in the research project, they were issued with a questionnaire pack containing a participant information sheet (Appendix 3), informed consent document (Appendix 4 provides an example of the consent forms used for all studies undertaken), a demographic information form (recording their handicap, age and number of competitions they had participated in), the SOP and TOPS. Participants completed the questionnaire packs at the golf club and returned them to the researcher on the same day. Golfers were instructed to complete both questionnaires as general measures. Owing to both the TOPS and SOP questionnaires being generic measures it was assumed that no differences in responses would occur as a result of the questionnaire being handed out either before or after the competition. This approach was in accordance with the researchers who developed the tool (Thomas *et al.*, 1999). Upon completion of the questionnaires, participants were given a participant debrief document (Appendix 5).

3.2.5 Data analysis

Data were analysed using Predictive Analytical Software (PASW) statistics version 18. Upon formation of the four processing groups preliminary analyses were undertaken, prior to the main analysis, to identify any potential covariate influences that would need to be accounted for. Firstly, two one way between group ANOVAs were undertaken to ascertain whether there were any significant differences between the four processing groups for age and handicap as these could have been covariate influences. A Pearson Rank Correlation was then performed to determine the relationship between age and skill level. Finally, in order to determine whether age and handicap were predictive of imagery and self-talk use in practice and competition (assessed using the total scores from the four TOPS subscales) four hierarchical multiple regressions were undertaken.

The main analyses adopted the use of a 4 (preferred cognitive style) x 2 (context) x 2 (psychological strategy) ANCOVA (handicap was controlled for as a covariate influence as a consequence of the findings from the preliminary analyses) to examine the role of preferred cognitive style in imagery and self-talk use in practice and competition.

Significance for comparisons and associations was set at *a* = 0.05. Observed power for selected comparisons was calculated along with effect sizes. Pearson correlations *r* (Field, 2005) were used to calculate effect sizes for main effects whilst cohen's *d* (1992) was used for specific comparisons.

3.3 Results

3.3.1 Preferred Cognitive Style Group characteristics

Table 3.1 presents the sample characteristics for each of the four processing groups. Low visual and verbal SOP scores indicate a strong preference for a particular processing style, whilst high scores indicate a low preference for a processing style.

Table 3.1: Sample characteristics for each processing group

Preferred cognitive style	Visual SOP score	Verbal SOP score	Age (yrs)	Handicap
High visual (n = 37)	18.51 (2.50)	29.05 (3.80)	39.62 (16.51)	9.54 (6.67)
High verbal (n = 36)	26.22 (2.94)	21.00 (2.64)	50.47 (13.05)	13.27 (6.65)
High both (n = 32)	18.56 (2.61)	21.44 (2.82)	42.34 (15.87)	9.22 (6.61)
Undifferentiated (n = 83)	26.00 (2.76)	28.04 (3.24)	46.17 (15.46)	11.90 (6.68)

Results revealed that there was a significant between groups effect for handicap ($F(3, 182) = 3.109$, $P<0.05$, $r = 0.22$, power = 0.72) with LSD post hoc tests (LSD post hoc tests were selected because the Scheffé post hoc tests failed to detect the between group differences) revealing that the "visual" ($P<0.05$, $d = 0.56$) and "high both" ($P<0.05$, $d = 0.40$) groups had significantly lower handicaps than the "verbal" group. A significant between groups difference was also found for age ($F(3,180) = 3.598$, $P<0.05$, $r = 0.22$, power = 0.79) and Scheffé post hoc tests revealed that the "visual" group were significantly younger than the "verbal" group ($P<0.05$, $d = 0.71$). Further to this a Pearson rank correlation revealed that age and handicap were moderately positively correlated ($r = 0.457$, $N = 188$, $P<0.05$). The correlation between the two variables would suggest that the age and handicap distributions should be treated with some caution as the two variables were related.

3.3.2 Age and handicap as predictors of imagery and self-talk use

Owing to the differences between the groups in age and handicap, it was of further importance to establish if the two variables were predictive of imagery and self-talk use in practice and competition. It has been suggested that it can be difficult to ensure that sample characteristics in different groups in non experimental research are the same and that results can sometimes be affected by covariate influences rather than the test variables (Tabaschnick & Fidell, 2000). Therefore, four hierarchical multiple regressions were undertaken to determine whether handicap and age were predictive of imagery and self-talk use in practice and competition. Handicap was entered into the regression equation first as there is extensive research supporting the role that skill level plays in imagery (Gregg & Hall, 2006; Hall *et al.*, 1990) and self-talk use (Hardy *et al.*, 2004). Table 3.2 presents the Pearson rank correlation coefficients between handicap and age, and imagery and self-talk use in practice and competition.

Table 3.2: Correlations between handicap and age, and imagery and self-talk use in practice and competition

	Competition self-talk use	Competition imagery use	Practice self-talk use	Practice imagery use
Handicap	-0.44**	-0.30**	-0.26**	-0.35**
Age	-0.22**	-0.13*	-0.07	-0.24**

Note: *<0.05, **<0.01

Pearson's rank correlation coefficients revealed that as age and handicap increased golfers' use of imagery and self-talk decreased. When handicap was entered into the hierarchical regression equation, significant models emerged for competition self-talk use ($F(1, 182) = 44.287$, $P<0.0005$), competition imagery use ($F(1, 182) = 17.488$, $P<0.0005$), practice self-talk use ($F(1, 182) = 12.960$, $P<0.0005$) and practice imagery use ($F(1, 182) = 25.981$, $P<0.0005$). Adjusted R^2 square values further indicated that handicap accounted for 19% of the variability in competition self-talk use, 8% of the variability in competition imagery use, 6% of the variability in practice self-talk use and 12% of the variability in practice imagery use. When age was added to the regression model, no significant change was found in the models for self-talk (F change(1, 181) = 0.48, P = 0.826) and imagery use (F change(1, 181) = 0.015, P = 0.904) in competition, or for self-talk (F change(1, 181) = 0.609, P = 0.436) and imagery use (F change(1, 181) = 1.798, P = 0.182) in practice. This lack of change was demonstrated further when the proportion of variability was not found to change with the addition of age (see Table 3.3), indicating that it accounted for little to no variability in the use of imagery and self-talk in practice and competition.

Table 3.3: Adjusted R^2 square values for handicap and age in predicting imagery and self-talk use in competition and practice

Variable	Adjusted R square
Competition self-talk use	
Step 1: Handicap	19%
Step 2: Handicap and age	19%
Competition imagery use	
Step 1: Handicap	8%
Step 2: Handicap and age	8%
Practice self-talk use	
Step 1: Handicap	6%
Step 2: Handicap and age	6%
Practice imagery use	
Step 1: Handicap	12%
Step 2: Handicap and age	12%

Finally, standardised beta coefficients for the handicap and age models (see table 3.4) indicated that, whilst handicap was a significant predictor of imagery and self-talk use in competition and practice, age was not. Hence age was not deemed to be a covariate influence but handicap was. Therefore a 4 x 2 x 2 ANCOVA (with handicap as a covariate) was performed to determine the differences between the four processing groups in imagery and self-talk use in practice and competition.

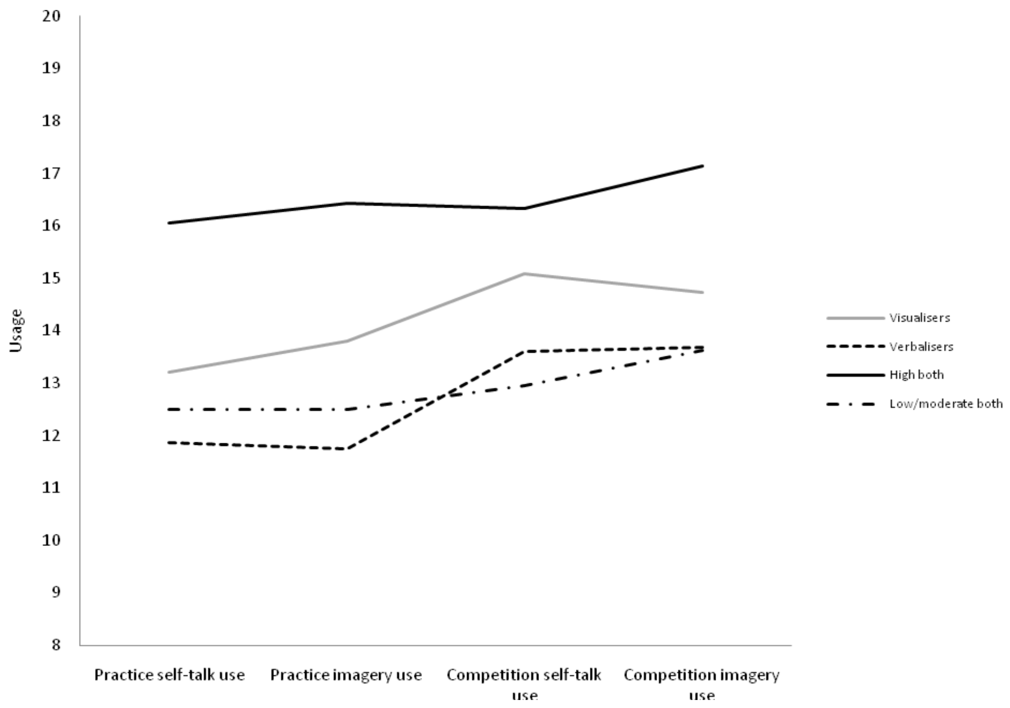
Table 3.4: Handicap and age predictor variable information

	SE B	t	P
Competition self-talk use			
Handicap	-0.435	-5.803	<0.0005
Age	-0.016	-0.220	0.828
Competition imagery use			
Handicap	-0.301	-3.765	<0.0005
Age	0.01	0.121	0.904
Practice self-talk use			
Handicap	-0.287	-3.555	<0.0005
Age	0.063	0.780	0.436
Practice imagery use			
Handicap	-0.306	-3.931	<0.0005
Age	-0.104	-1.341	0.182

3.3.3 Preferred Cognitive Style and imagery and self-talk use

An ANCOVA with repeated measures on context (practice and competition) and psychological skill (imagery and self-talk) was undertaken to examine the differences in imagery and self-talk use in practice and competition by visualisers, verbalisers, “high both” and “low/moderate both” groups. The use of questionnaire subscales as repeated measures is common practice in data analyses in sport psychology (Arvinen-Barrow *et al.*, 2007). As such, using a similar method for the present study was deemed to be acceptable. Handicap was identified as having a covariate influence. Although age had been found to be related to imagery and self-talk use, it was not predictive and as such, was not included as a covariate in the analyses. Field (2009) suggests that researchers need to be careful when selecting covariates for analyses and ensure that they do not select too many, as their selection can filter out too many of the main effects. Figure 3.1 displays the mean imagery and self-talk use scores by preferred cognitive style in practice and competition.

Figure 3.1: Imagery and self-talk use in practice and competition for each processing group



Results revealed that there was a significant main effect for preferred cognitive style (F(3, 181) = 14,272, P<0.05, *r* = 0.44, power = 1.0). Follow-up Bonferonni adjusted pairwise comparisons revealed that the "high both" group used psychological skills (imagery and self-talk collectively), regardless of condition, significantly more than the visualisers, verbalisers and the "low/moderate group". A main effect for context was also found (F(1, 181) = 24.215, P<0.05, *r* = 0.34, power = 1.0), with psychological skills use being greater in competition than practice. Despite this no other significant effects were found. See Appendix 6 for all none significant results.

3.4 Discussion

3.4.1 Preferred cognitive style and imagery and self-talk use

Previous research into the role that preferred cognitive style plays in the effectiveness of imagery and self-talk training has been equivocal (O'Halloran & Gauvin, 1994; Thomas & Fogarty, 1997). Data obtained from this study added to this ambiguity further. Results provided no support for the role of preferred cognitive style as a determinant of golfers' preferences for the use of imagery or self-talk over one another. However, results did reveal that golfers who displayed preferences for both visual and verbal processing employed both psychological strategies significantly more than any of the other processing groups. A possible explanation for this finding may be provided by referring to Paivio's dual coding theory (1971). Paivio presented a model of processing which suggested that activity in one processing channel could induce activity in the other. As such, it may be possible that those with a preference for both modes of processing employ the use of visual and verbal psychological strategies more, because the use of one strategy repeatedly triggers the use of the other which may result in an escalation in the use of both of the strategies.

The finding that golfers, regardless of preferred cognitive style, used imagery and self-talk in equal proportion is in accordance with results from previous research that has found that golfers widely employ the use of both strategies to facilitate performance (Cotterill, Sanders & Collins, 2010). It is possible that golfers employ the use of both strategies widely because they believe them to be necessary for peak performance. As such, golfers may override their processing preferences in order to employ the most beneficial set of strategies. Richardson (1977) argues that many people are able to switch between processing strategies when the situation requires them to do so.

Although golfers may be able to apply psychological strategies that are not concordant with their processing styles, the ease with which they can apply them may differ. The use of self-talk by visualisers, who had a low preference for verbal processing, may have been relatively easy because it has been argued that self-talk is a simple skill that can be employed by everyone (Thomas & Fogarty, 1997). The use of imagery by dominant verbalisers, however, may have been more difficult because imagery can be a complex skill that is often difficult to apply (Paivio, 1986). As such, in order to overcome the complexity associated with the use of imagery, the verbalisers may have applied accompanying verbalisations to guide themselves through the strategy; this could mean that although the verbalisers scored themselves highly on imagery use, the strategy that they were actually employing was self-talk driven. It has previously been found that verbalisers tend to talk themselves through imagery as opposed to using the strategy on its own (O'Halloran & Gauvin, 1994) and this may be a conscious process. Riding and Al-Salih (2000) previously posited that visualisers' use of imagery may be largely involuntary, whereas verbalisers may employ more voluntary imagery as they feel less comfortable using the strategy but consciously make the effort to do so.

Another explanation for the lack of effect that preferred cognitive style had on imagery use may be provided by discussing the multisensory nature of imagery (Munroe *et al.*, 2000). Athletes have been found to report a range of senses when engaging in imagery use, although they place more emphasis on the use of visual and kinaesthetic senses (Moran & MacIntyre, 1998). Of particular relevance to the present study is the suggestion that kinaesthetic imagery may be more central to sports where 'feel' is important (Barr & Hall, 1992). It is widely acknowledged that 'feel' is central to golf performance (Gallwey, 1979; Lee, 1998). As such it might be possible that the imagery employed was driven more by the use of kinaesthetic senses rather than visual senses and, as a result, may explain why a visual preferred cognitive style was not found to be a mediating factor in use.

Although no significant differences were found between the groups in imagery and self-talk use, results did reveal that golfers used more imagery and self-talk in competition than practice. This finding is in agreement with previous research (Hall *et al.*, 1990; Hardy *et al.*, 2001a; Hardy *et al.*, 2005; Weinberg *et al.*, 2003) and may in part be due to the higher prevalence of stressors and distractions in competition (Hardy *et al.*, 2005; Weinberg *et al.*, 2003). This adds to the debate regarding the factors influencing imagery and self-talk use and suggests that golfers' use of the strategies may be a function of contextual factors rather than innate individual differences in preference.

3.4.2 Age and handicap differences between processing groups

The overall purpose of this investigation was to examine the role that golf players' preferred cognitive styles played in their imagery and self-talk use in practice and competition. However, prior to the main analysis being undertaken the age and handicap distributions of the different processing groups were explored to identify any potential covariate influences. Whilst it was not a primary objective of the study to examine the age and handicap distributions across different processing groups, some interesting findings emerged. Results revealed that the visualisers were significantly younger than verbalisers. The greater preference for visual processing in younger people may result from them being more widely exposed to visual information in the form of television and computer games than older people; this higher exposure to visual information may cause them to use visual processing strategies more readily than verbal strategies (Lighter & Eastman, 2002).

Results also revealed that those with a preference for visual processing, and those with a strong preference for both visual and verbal processing, had significantly lower handicaps and were therefore more skilled than those with a preference for verbal processing. Golf is a sport which involves a high degree of visual scanning. It is therefore possible that participants with a high preference for visual processing may have the higher visuospatial abilities that are necessary for playing golf. This finding adds to the debate surrounding the relationship between preferred cognitive style and ability (Antonietti & Giorgetti, 1998; Green, & Schroeder, 1990) as it appears to suggest that visual ability is related to a visual preferred cognitive style. O'Halloran and Gauvin (1994) have previously found that visualisers perform better on simple motor tasks than verbalisers, suggesting that the preference for visual processing may be beneficial to the performance of tasks reliant on vision. However, Richardson (1983) has recommended a degree of caution about inferring ability from processing style and has argued that it is likely that the relationship can only be indirect.

3.4.3 Skill level and age effects on imagery and self-talk use

Although it was not a direct objective of the study, results revealed that handicap was a significant predictor of imagery and self-talk use in practice and competition. This is in accordance with previous research that has found that more skilled athletes use more imagery and self-talk than their less skilled counterparts in a variety of other sports (Gregg & Hall, 2006; Hardy *et al.*, 2004; Hall *et al.*, 1990; Salmon *et al.*, 1994; Thomas *et al.*, 1999). Age alone was not a significant predictor of imagery and self-talk use although it was found to be inversely correlated. However, it must be noted that these relationships were not significant for self-talk use in practice. The role that age plays in athletes' self-talk use is under-researched compared with its examination in imagery use. Gregg and Hall (2006) previously found that young golfers used significantly more cognitive forms of imagery than older golfers. It was proposed that this was because the older golfers might perceive golf to be a more recreational activity and, as such, may be less concerned with improving. Although this explanation is appealing caution must be applied in accepting it as to date no research has tested it.

3.4.4 Conclusion

Before concluding, it is important to acknowledge a limitation associated with the study which may have had implications for data obtained. The four subscales of the TOPS questionnaire, which assessed golfers' use of imagery and self-talk in practice and competition, were not presented in a counterbalanced order. All golfers completed the subscale pertaining to self-talk usage during competition first, then imagery usage during competition second. These were followed respectively by the two subscales assessing self-talk and imagery use in practice. The lack of counterbalancing may have led to a fatigue effect on the final questions. However, this is unlikely as the four subscales together only contained sixteen items in total, which is relatively short for a sport psychology questionnaire.

To conclude, little support was found for the role of preferred cognitive style as a determinant of golfers' preferences for the use of imagery or self-talk over one another in practice and competition. Instead, results revealed that all golfers, regardless of preferred cognitive style, used the strategies in equal measure with more being made of their use in competition than practice. Interestingly, results revealed that golfers who displayed a preference for both modes of processing were found to employ both strategies more than those who had a preference for either one or neither modes of processing. It was proposed that those with a preference for both modes of processing may experience an escalation in the use of both strategies, as the use of one strategy may continuously trigger the use of the other.

To conclude, the overall aim of this thesis was to identify the factors influencing golfers' use of imagery and self-talk to add direction and rationale to the development of an intervention. Findings from this study revealed that golfers' preferred cognitive styles were not associated with preferences for the use of imagery or self-talk. It was therefore concluded that this avenue of research did not require further investigation. Instead, findings revealed that golfers, regardless of preferred cognitive style, reported the use of both imagery and self-talk in equal proportions in both practice and competition, with use being greater in competition. This lends credence to not only the argument that imagery and self-talk use may be a function of contextual factors rather than individual differences, but also provides an indication of the relative importance placed on the use of both strategies. Although information from the current study was insightful it raised questions regarding the interrelated use of the two strategies. For example, were golfers using imagery and self-talk in combination, or were they reserving the use of the strategies for different functions in different situations within practice and competition? As such, further research was warranted to examine how the strategies may be used in combination and isolation, and how other external factors might influence this usage.

4. Study 2: Golfers' use of imagery and self-talk in combination and isolation

4.1 Introduction

Study one examined how golfers' preferred cognitive styles related to their use of imagery and self-talk. Results revealed that, regardless of preferred cognitive style, golfers utilised both imagery and self-talk, with the use of the strategies being greater in competition than in practice. Furthermore, golfers with a strong preference for both visual and verbal processing were found to use imagery and self-talk more than golfers with a preference for one mode of processing over the other, or neither modes of processing. Whilst the results from the previous study ruled out the possibility that preferred cognitive style influenced golfers' preferences for the use of imagery and self-talk over one another, they also revealed a lack of understanding about how and why the two intervention strategies were used independently and in combination.

As was alluded to in the review of literature, previous research has shown that both imagery and self-talk can be used independently to facilitate the learning and execution of skills and strategies (Driskell *et al.*, 1994; Feltz & Landers, 1983; Hardy *et al.*, 2001a; Hardy *et al*, 2005a; Landin, & Herbert, 1999; Munroe *et al.*, 2000; Nordin & Cumming, 2005a; Ziegler, 1987), enhance confidence (Abma *et al.*, 2002; Bandura, 1986; Hatzigeorgiadis *et al.*, 2008; Moritz *et al.*, 1996) and motivation (Gammage *et al.*, 2001; Munroe *et al.*, 2000), and regulate arousal/anxiety (Hatzigeorgiadis *et al.*, 2007; Hatzigeorgiadis, *et al.*, 2009; Munroe *et al.*, 2000; Nordin & Cumming, 2005a; White & Hardy, 1998). Upon conducting a qualitative study which examined where, when, what and why athletes used self-talk, Hardy *et al*. (2001a) started to draw parallels with imagery in terms of the functions that it served. This led to suggestions that there could be additive effects associated with the combined use of imagery and self-talk, particularly when using the strategies to facilitate the learning and execution of skills, and enhance confidence (Hardy *et al*., 2001a).

It is likely that the additive effects associated with the combined use of imagery and self-talk in serving these functions specifically were emphasised because there is strong theoretical support for how these effects might occur. For example, whilst imagery and self-talk can be used independently, theories of learning (Annett, 1993), and cognitive processing (Paivio, 1971, 1986, 1991) suggest that the two strategies are actually intrinsically linked. Although Paivio (1991) proposed that information could be processed independently in visual and verbal channels, he argued that activity in each of these channels could 'spark' activity in the other. Consequently, this theoretical model presented the idea that visual and verbal codes, such as imagery and self-talk, could naturally invoke one another. Of more relevance, Paivio

(1986) proposed that when undertaking evaluative tasks, such as planning the execution of skills, verbal cues could be used to invoke and manipulate images where appropriate. This notion provides sound theoretical support for how the strategies may complement one another when facilitating the learning and execution of skills. Additionally, whilst Annett (1993) also suggested that verbal cues and images could induce one another, he proposed a more prescriptive model for the interrelated use of the strategies in the learning and execution of skills called the Action Language Imagination (ALI) theory. More specifically, this theory proposed that imagery was the connection between the transformation of verbal cues into the execution of skills, and demonstrations into the recall of verbal labels. As such, he proposed, similarly to Paivio (1986), that verbal cues could be used to invoke the necessary images for the execution of skills which would subsequently aid their performance. Evidence to support the suggestion that performance effects may be greater with the use of imagery and self-talk together in facilitating the learning and execution of skills was found when Hall *et al.* (1997) examined the effect that imagery and self-talk interventions, in combination and isolation, had on the retention and subsequent recall of twelve simple movement patterns. Results revealed that the recall of the movements was significantly enhanced when participants used imagery and self-talk together, compared to when they used them in isolation.

In addition to the theoretical and experimental support for the combined use of imagery and self-talk in facilitating the learning and execution of skills, Hardy *et al*. (2001a) suggested that there could be additive effects associated with the combined use of the strategies in serving mastery functions, such as confidence and self efficacy enhancement. The theoretical support for this suggestion stemmed from Bandura’s (1986) theory of self efficacy which suggests that vicarious experiences and verbal persuasion can be used to enhance self efficacy. Although there would appear to be a sound theoretical rationale for the combined use of the strategies in serving this function, Cumming *et al.* (2006) found no empirical support when they examined the effect that the combined use of facilitative imagery and self-talk had on ratings of self efficacy for a novel dart throwing task. Results revealed that the combined use of imagery and self-talk led to improved dart throwing performance, however no improvements in self efficacy were found. Although this finding appears to cast doubt over the additive effects associated with the combined use of imagery and self-talk in self efficacy enhancement, it must be noted that the authors suggested that ratings of self efficacy could have been influenced by perceived performance accomplishments rather than the psychological strategies.

Although findings from the research profiled indicate that improved performance can be experienced with the combined use of imagery and self-talk (Cumming *et al*., 2006; Hall *et al*., 1997), both studies were conducted in controlled laboratory settings. Thus they failed to account for the role that different contextual factors may have played in the use of the strategies. Contextual factors pertain to how different situations influence imagery and self-talk use and might have particular significance for how preferences for the use of one strategy over the other might be formed. Fournier *et al*. (2008) proposed that situational factors are the key determinant of why and how imagery is used. Although less attention has been paid to the role that contextual factors play in self-talk use, there is evidence to suggest that the use of the strategy is also determined by these factors. This was confirmed when findings from a cross-sectional study revealed that collegiate athletes used self-talk to control nerves and rehearse strategies more in competition than in practice (Hardy *et al*., 2005a). Whilst there is evidence of the role that situational factors play in the use of imagery and self-talk independently of one another, it might be possible that they also cause preferences for the use of one strategy rather than the other to be formed. For example, previous research has revealed that athletes tend to place more emphasis on the use of imagery as a pre competitive strategy (Munroe *et al.*, 2000; Weinberg *et al.*, 2003) and self-talk as a strategy to be used during competition (Gammage *et al.*, 2001; Hardy *et al.*, 2005a). Moreover, it has been suggested that self-talk may lend itself better to use during competition than imagery, as it is a quicker and easier strategy to employ (Hardy *et al.*, 2005a). These findings suggest that contextual factors may influence athletes' preferences for the use of imagery and self-talk over one another and as such require further investigation. This is because it might not be as straight forward as to suggest that imagery and self-talk should always be used in combination

Along with the potential influence that contextual factors may play in the use of imagery and self-talk, there is initial evidence to suggest that functional requirements might also result in preferences for the use of imagery and self-talk over one another. For example, although there is theoretical support for the combined use of imagery and self-talk in facilitating the learning and execution of skills, research has revealed that athletes use self-talk more than imagery to control cognitive anxiety (Fletcher & Hanton, 2001). It has been suggested that this is because self-talk is a more appropriate strategy for directly tackling the negative verbalisations that characterise cognitive anxiety (Goleman, 1995). Although there is limited research into the role that functional requirements play in athletes preferences for the use of imagery and self-talk, these findings would appear to indicate once again that it is not as straight forward as to suggest that the strategies should always be used together.

A final factor which warrants consideration before the formulation of recommendations for the combined use of imagery and self-talk, is that there is considerable individual variation in the way in which imagery (Nordin & Cumming, 2005a) and self-talk (Hardy *et al*., 2010) are represented when serving various functions. It was originally proposed that athletes should use specific imagery (Paivio, 1985) and self-talk (Theodorakis, 2000) contents to serve particular functions. For example, Moritz *et al*. (1996) suggested that in order to most successfully experience elevations in confidence athletes should imagine being confident. Similarly, there is a school of thought in the self-talk literature that the content of verbal statements should directly match the function being served (Theodorakis *et al*., 2000). Whilst this is intuitively appealing recent research has demonstrated that athletes use a variety of imagery (Short *et al*., 2004) and self-talk (Hatzigeorgiadis *et al*., 2007) contents to serve the same functions. This consequently makes it difficult to suggest how the imagery and self-talk should be used together to serve particular functions.

Although some headway has been made in examining the combined and independent use of imagery and self-talk, currently research has raised more questions than answers. The current study sought to address this ambiguity by examining how golfers used the strategies in combination and isolation. Moreover, as a consequence of the evidence presented, and the aims of this thesis, the objectives of this study were to:-

- Examine the role that contextual factors played in golfers' use of imagery and self-talk. More specifically, the use of the strategies, independently and in combination, was examined in relation to practice, competition and miscellaneous venues. The study specifically sought to identify what golfers' preferences were for the use of imagery and self-talk in different situations.
- Ascertain the role that functional requirements played in golfers' use of imagery and self-talk. In particular, the use of imagery and self-talk in facilitating the learning and execution of skills and strategies, enhancing mastery and motivation and controlling anxiety was examined. Particular attention was paid to the preferences that golfers had for the independent and combined use of imagery and self-talk in

serving different functions. Furthermore, the different contents of imagery and self-talk used to serve a range of functions was examined.

- Gain insight into the relative importance of imagery and self-talk for golfers. Furthermore, the interplay between the strategies was examined to add to the existing theoretical knowledge base.

4.2 Method

4.2.1 Design

A qualitative research approach, which adopted the use of individual semi-structured interviews and follow-up interviews with competitive golfers, was deemed to be most appropriate for answering the research questions. There were several reasons for this decision which are outlined in the next paragraph.

The review of literature revealed that the relationship between imagery and self-talk is complex (Paivio, 1986) and under researched with only two studies directly examining the performance effects associated with the combined use of the strategies (Cumming *et al*., 2006: Hall *et al*., 1997). Furthermore the variation in how athletes employ imagery (Nordin & Cumming, 2005a) and self-talk (Hardy, 2006) indicates that their use is highly individualised. A qualitative approach enabled these complexities and individual differences to be examined. It is widely accepted that qualitative research allows for different people's experiences to be presented, acknowledging that perspectives on situations or phenomena may vary (Denzin & Lincoln, 1994). Furthermore, it can be used to present descriptions and interpretations of complex processes, relationships and how different contexts affect peoples' experiences (Strean, 1998). Qualitative research lends itself to studies that require intricate details about phenomena (Strauss & Corbin, 1998). It is particularly useful when there is little existing research on a topic, as findings can lead to the development of future hypotheses (Auerbach & Silverstein, 2003; Strean, 1998).

4.2.2 Participants

Upon gaining ethical approval from the school ethics committee, telephone contact was made with competitive male golfers from golf clubs, golf teams and social networks in the

North East of England. Golfers of varying skill levels were purposively sampled to match the broad range of golfers sampled in the previous study. This approach to participant recruitment was taken as findings from the previous study revealed that golfers of all skill levels reported using both imagery and self-talk in equal proportion. Despite this, the previous study was unable to provide any information about the interplay between the two strategies. As a consequence the purpose of this study was to provide more specific detail about how golfers, of similar abilities to those sampled in the previous study, employed the use of the strategies in combination and isolation to help better understand their use. In doing so, findings from this study were applicable to golfers of a range of abilities. After approaching a range of golfers to volunteer for the study, ten competitive male golf players were recruited. Table 4.1 presents the participant characteristics of the golfers recruited (Mean age = 40.8 ± 12.48); Handicap range = 0 - 24). In accordance with the handicapping system (HandicapMaster, 2009) and Gregg and Hall (2006) seven of the golfers were skilled category one golfers (Mean handicap = 1.2 ± 1.5), age = 35.9 ± 11.5). Category one golfers' are skilled golfers who have handicaps of ≤5.

Table 4.1: Participant characteristics

Participant ID	Age	Handicap	Representation
1	19	2	University, county, club competitions
2	35	4	Club team
3	44	1	Club team, county
4	41	professional	Local, regional, professional competitions
5	48	professional	Professional, amateur competitions
6	57	11	Club competitons
7	43	professional	Professional competitions
8	49	21	Club competitions
9	51	22	Club competitions
10	21	2	County, scratch competitions

4.2.3 Procedure

Semi structured interviews were used as the means to collect the data. When conducting semi structured interviews, the interviewer is equipped with a list of general questions from which they can deviate, should other interesting topics emerge (Bryman, 2001). Interviews are the most commonly used qualitative method in sport psychology (Culver, Gilbert & Trudel, 2003). Although interviews can be both structured and unstructured, the specific benefits of semi-structured interviews are that they allow for guidance throughout the process whilst also permitting flexibility (Rubin & Rubin, 1985). This is of importance as it has been argued that interviews require some degree of flexibility in order to ensure that individuals' experiences can be fully captured (Dale, 1996). Consequently, this interview approach was deemed to be most appropriate for this study.

All interviews were conducted at a location and time convenient to the golfers, typically in quiet and private rooms at the golfers' home clubs. The predominant reason for allowing the golfers choice in the interview's location was to encourage them to feel more relaxed during the interview process. This was of importance as it has been suggested that interviews are most effective when participants feel comfortable (Rubin & Rubin, 1995). All interviews were recorded to ensure that a direct record of what was said could be created. In order to ensure the golfers' comfort with this process, they were informed that the data that they provided would be treated anonymously and confidentially.

Prior to the interview, all golfers were verbally guided through the nature of the investigation, provided with a participant information document (Appendix 7) and were told that the purpose of the study was to examine how they used imagery and self-talk in combination and isolation. Once participants were happy with the nature of the study, they provided their informed consent. The concepts of imagery and self-talk were then introduced. To aid their understanding, the following definitions of self-talk and imagery, respectively, were provided.

"Self-talk refers to the dialogue that you have with yourself, it can either be outloud or you may talk to yourself in your mind so that only you can hear what you are saying" (Theodorakis, 2000).

"Imagery is the creation or re-creation of experiences in the mind" (Vealey & Greenleaf, 2006, pp307).

Once the golfers were provided with these definitions, different examples of how they might use self-talk were discussed with them to reaffirm their understanding of the concept. They were told that they may use self-talk to get themselves psyched up, to stay focussed or "keep going." In addition, they were also provided with examples of how they might use imagery to increase motivation and confidence and facilitate the learning of skills.

The same interview guide was used with each golfer to ensure that they were all asked the same questions. However, the use of a semi structured interview guide also permitted the golfers to deviate and discuss certain topics more widely should they feel it was necessary. The interview guide was based on those used by Hardy *et al.* (2001a) and Nordin and Cumming (2005a) and consisted of four main sections containing different questions. Firstly, the golfers were asked about where, when, and why they used imagery and then, similarly, about their use of self-talk. They were then asked if they used combined imagery and self-talk and if so, why. The final section explored the participants' thoughts and experiences of how, and how well, the two strategies worked in combination. These questions specifically focussed on whether or not the golfers used imagery and self-talk to serve different functions, if they found the use of one strategy more important than the other and finally, what the temporal patterning of their imagery and self-talk use was. The role of context (where and when) and function (why) was deemed to be particularly important as previous research has revealed these factors to be potential mediators of use (Hanton & Jones, 1999a; Hardy *et al.*, 2005a). Golfers were encouraged to talk about their own experiences and questions were directed towards their specific use of imagery and self-talk as opposed to remaining in the abstract. Although the structure of the interview was considered to ensure that the key research questions were covered, probes and follow up questions were asked when further information was required about the participants' responses to the main questions (Rubin & Rubin, 1995). See appendix eight for the interview guide.

Upon completion of the initial round of the interviews, it became apparent that the skilled golfers (handicap ≤ 5) were better able to discuss their use of imagery and self-talk than the less skilled golfers. This is, perhaps, not surprising given that previous research has found that more skilled athletes tend to use psychological strategies more widely than less skilled athletes (Gregg & Hall, 2006; Hall *et al.*, 1990; Hardy *et al.*, 2004; Salmon *et al.*, 1994; Thomas *et al.*, 1999). Results from study one supported this further with the skilled golfers being found to use imagery and self-talk more widely than the less skilled golfers in competition than practice. Given the limited responses from the less skilled golfers about their usage of imagery and self-talk, the decision was taken to base the data analysis only on the skilled golfers' ($n = 7$, handicap $= 1.2 \pm 1.5$, age $= 35.9 \pm 11.5$) responses, as the less skilled golfers' responses were not sufficiently represented in the data analysis.

Furthermore, preliminary analysis completed during the ongoing process of the interviews led to the development of additional questions for the skilled golfers to clarify and develop emergent themes. Questions pertaining to: a) the different content of imagery and self-talk b) the temporal patterning of the golfers' imagery and self-talk use c) how the two strategies could be used together to serve different functions and d) the nature of the relationship between imagery and self-talk when used in combination, were covered in follow up interviews. See appendix nine for the follow up interview schedule. Following completion of these interviews in-depth analysis was completed.

Upon completion of the interviews, participants were issued with a debrief document (Appendix 10) which provided additional information regarding the nature of the study, the researcher's contact details and their participant identification number. Participants were informed that if they wanted their results to be withdrawn from the study, they could contact the researcher and cite their participant number or name, and their results would be removed and destroyed as soon as possible.

4.2.4 Data Analysis

Before the data were analysed, all the interviews were transcribed verbatim allowing not only for the creation of a direct record of what the golfers said, but also enhancing the researcher's familiarity with the data. Upon completion of the transcribing, content analysis was undertaken using guidelines presented by Côte, Salmela, Baria, and Russell (1993). Content analysis involves organising data and formulating themes from a mass of information (Côte *et al*., 1993). As a result of going through this process a total of four major themes were created; where/when golfers used imagery and self-talk in combination and isolation, why they used the strategies to serve cognitive and motivational functions in combination and isolation and what their perceptions of the strategies were, i.e., did golfers prefer one strategy over the other, did they think the strategies worked well together?

A series of discrete processes were undertaken to facilitate the development of these major themes. Firstly data were organised through a process of creating tags. This process involves drawing together similar segments of interview data which represent a range of distinct descriptive concepts. Open coding (Strauss & Corbin, 1998), which is largely inductive (Patton, 2002), was used during this process as the concepts were directly created from the interview data. Examples of the concepts created at this stage included the specific situations where golfers used imagery and self-talk, e.g., home, car etc. Once these descriptive concepts had been created a process of conceptual ordering then took place whereby higher order categories were created by listing and collating concept tags with similar meanings. An example of a higher order category was competition imagery use with the concepts of imagery use before, during and after competition being collated under this one category. This process of linking concepts together is often referred to as axial coding (Strauss & Corbin, 1998). Upon completion of the development of the categories the four higher order themes discussed previously were created. This process is referred to as selective coding (Strauss & Corbin, 1998). The creation of these themes was both inductive and deductive as existing literature was drawn upon to help refine and develop codes (Patton, 2002). The overall aim of the process was to identify recurring themes on phenomena. Categories were created until theoretical saturation was achieved. This happens when new data fits comfortably into existing themes without new themes having to be created (Côte *et al.*, 1993).

4.2.5 Data quality

In order to ensure the trustworthiness of the data the principal researcher employed the use of two methods proposed by Lincoln and Guba (1985). The quality of qualitative data is often judged on its credibility, transferability, dependability and confirmability. The credibility of the data, as the name suggests, refers to whether the findings are credible and accurately represents reality. Credibility can be confirmed through the use of a number of methods although peer debriefing and member checking are the most commonly used strategies.

Lincoln and Guba (1985) emphasised member checking as the most important strategy for confirming credibility. Member checking is a process whereby the participants who provided the data test the ‘correctness’ of the concepts, interpretations and conclusions. Whilst this method is hugely popular amongst researchers it is not without its issues (Sparkes, 1998). Firstly, many researchers in the past have incorrectly undertaken member checking. For example, many have claimed to have used the strategy yet in reality have not as they have only requested that participants read through their transcripts rather than the data in its analysed and interpreted form (Sparkes, 1998). Further issues with member checking include whether participants have the required interest or understanding of psychological concepts to successfully check the conclusions drawn (Silverman, 1993). For example, the analysis of qualitative data often results in the formation of theoretical concepts which are unlikely to resonate with the average athlete. Given the issues associated with the use of member checking the decision was taken not to use the strategy for this study. Instead the credibility of the data was confirmed through the use of peer debriefing. This method involved the principal researcher discussing the findings, and potential different conclusions about them, with a member of the supervisory team. This was to ensure that all possible perspectives in the presentation of the participants' views had been considered.

Peer debriefing was also used to ascertain the confirmability of the data. Confirmability refers to the degree to which different researchers agree with the formation of the themes. In order to ensure the transferability of the data, which refers to whether the data can be transferred to different populations, a thick description of the population, methods, data analysis and findings was provided to enable readers to make judgements about whether or not the findings could be applied to other populations. This thick description of methods also provided an indication of the dependability of the data. The dependability of the data refers to whether or not there were any changes, in the context of where the interviews were conducted, or the way in which data were analysed, which may have affected the findings (Lincoln & Guba, 1985). In order to ensure the dependability of the data, all interviews were conducted at the golfers' own golf clubs which were familiar, relaxing and free from distraction. The same interview guides were employed with each participant although additional questions were asked where further discussion was deemed necessary. The skilled golfers took part in follow up interviews, which the less skilled golfers did not, however this was not deemed to compromise the dependability of the data as the less skilled golfers' responses were not used in this study because of a lack of depth.

4.3 Results

The results outline where, when and why the golfers used imagery and self-talk independently and in combination. A section on 'what' (the content of the golfers' imagery and self-talk) is not presented as it is implicitly embedded within the other categories. Based on the work of Hardy *et al.* (2001) and Munroe *et al.* (2000) coding trees are presented for each of the main topics. The figure 4.1 denotes the colours used to highlight when imagery and self-talk were used in combination and isolation, and when they were used separately in the same context or for serving the same function.

Imagery in isolation	
Self-talk in isolation	
Imagery and self-talk in combination	
Imagery and self-talk used separately in the same context	
Imagery and self-talk used separately for serving the same functions	

Figure 4.1: Key for golfers' use of imagery and self-talk

4.3.1 Where and when do golfers use imagery and self-talk?

Figure 4.2 details where and when the golfers reported the use of imagery and self-talk. Golfers reported using imagery and self-talk in isolation and combination in a variety of different situations in relation to practice, competition and miscellaneous venues.

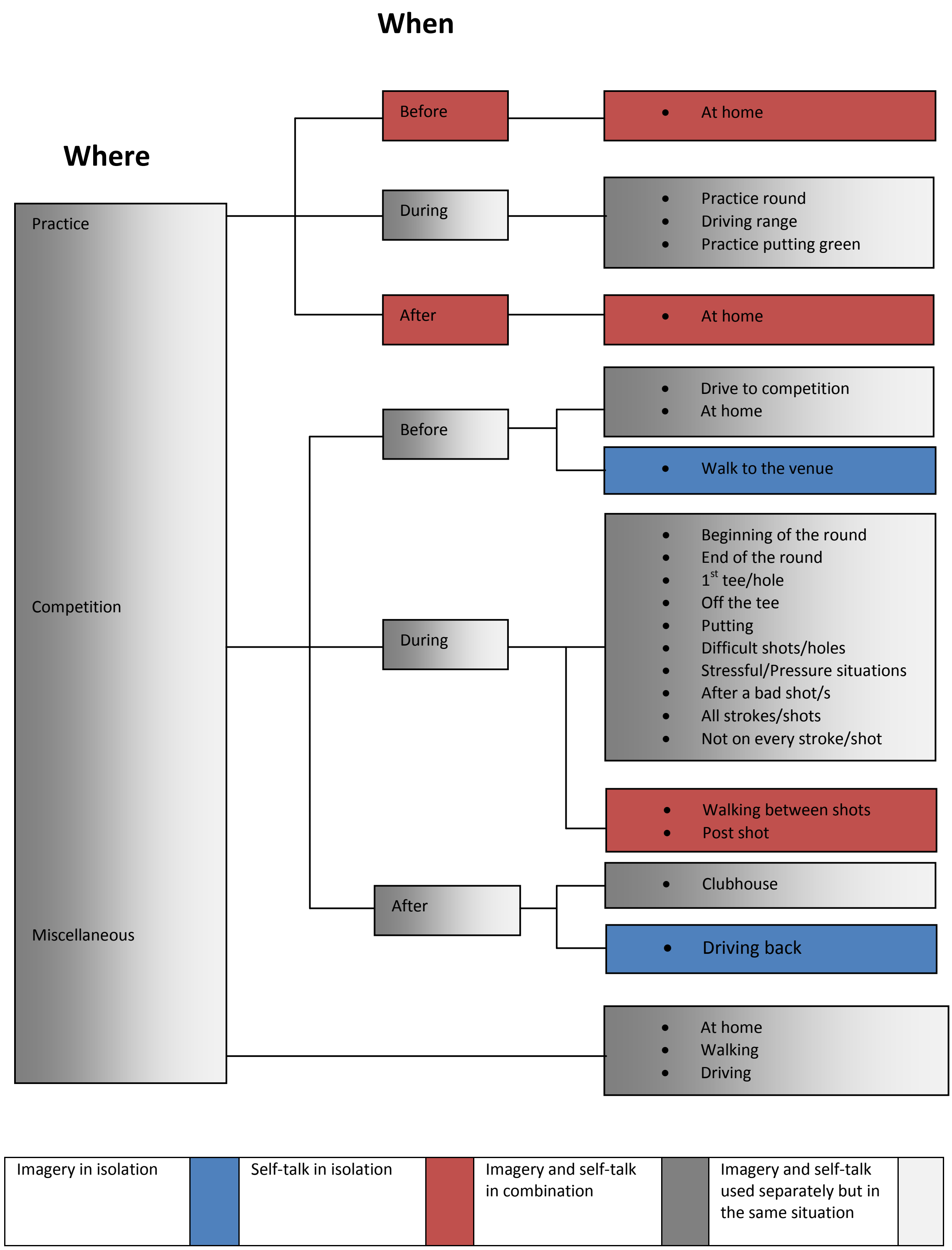


Figure 4.2: Where and when golfers use imagery and self-talk

4.3.1.1 Where golfers use imagery and self-talk

As can be seen from Figure 4.2, at a global level the golfers reported using both imagery and self-talk, in combination and isolation, in relation to practice, competition and miscellaneous contexts. The use of both of the strategies was much more widely emphasised in relation to competition compared with practice, although a number of the golfers also reported using them extensively in practice. When employing them during practice, however, the golfers reported that the strategies were far more technical than they would be in competition, suggesting that context may be linked to function. The participant quotes below illustrate this clearly.

"when you practice it's more introverted. So you are thinking about the detail of the technique but when you play it's less detailed, more feel and a simpler image basically." (P4)

"I'll use both more so in a competition. I'll probably rehearse things in my mind and it's a combination of both. In a practice round they'll probably be used more individually, I'll have probably thought about shots separately between imagery and self-talk. Whereas when it comes to competition they'll probably be shortened because they should be, they will have been rehearsed more so I probably won't self-talk as much and I won't think technically about what I'm going to do. They'll be two very quick combinations if I'm going to play a shot."(P10)

In addition to using the strategies during practice to develop technique, participant five further suggested another way in which imagery could be used at this time point.

"I imagine how I would be playing….so I would be transporting myself into a competitive situation you see what I mean so and that's it really so how I'm feeling and thinking at that point really."(P4)

The use of imagery and self-talk were also highlighted in miscellaneous contexts such as in the home. In these scenarios the golfers reported using the strategies to either increase their positivity or develop their game plans.

"As I say it's kind of a combination of both. If you were to play a new course or something, you'd think, or you'd go away and look at it and you'd talk yourself through the course, talk yourself through the shot that you need to play and imagine the shot that you need to play so it's both." (P10)

Findings indicate that golfers use imagery and self-talk, in combination and isolation, more in relation to competition than practice. Furthermore, when the strategies are used during practice, they are more technical than they are in competition.

4.3.1.2 When golfers use imagery and self-talk

Further examination of when the golfers specifically reported using imagery and self-talk revealed that they emphasised their use before, during and after competition. Moreover, more use was made of imagery and self-talk, in combination and isolation, during competition than before or afterwards. When the strategies were used before competitions, the golfers specifically reported using them during the drive or walk to the competition. The three participant quotes below demonstrate how imagery and self-talk were used by the golfers in isolation and combination, respectively, before a competition.

> *"What I do is walk to the golf club about an hour before & I always try and be positive & focussed when I'm walking & think about the good shots that you've had & get the bad ones out the way." (P3)*

> *"Basically from when I wake up to the moment you tee off you'll be thinking about it (competition)....building yourself up for it." (P1)*

> *"It's kind of a combination of both if you were to play a new course or something. You'd go away and look at it and you'd talk yourself through the course, talk yourself through the shot that you need to play and imagine the shot that you need to play." (P10).*

It has already been established that golfers predominantly use imagery and self-talk in competition as opposed to during practice. More specifically, when the strategies were employed during competition use was found to be greatest prior to the production of a variety of golf strokes. Although some of the golfers reported their use of imagery and self-talk as part of a pre-shot routine prior to the execution of every golf stroke, most reported the spontaneous usage of the strategies. Moreover, many emphasised their usage and importance on particular shots. There was considerable variation between the golfers in the nature of the shots where they emphasised the use of the strategies. For example, some of the golfers widely reported the use of the strategies on shots played onto the green, whilst others used them only on difficult shots. When used prior to the production of golf strokes, imagery and self-talk were widely used in combination rather than in isolation. The participant quote illustrates their combined use in this situation.

"I think combining the two is mainly going to be the shot type and stuff so.....you combine them to give you the most information that you can, you look at the image, you talk to yourself about it and then as soon as you're over the ball you forget. But if you look at it right bunker there, bunker there, work out distances and stuff. Right pins at the back of the green (inaudible) club, you've made your decision then you're stood over the ball and you know what's happening so I guess you should be able to stand over the ball and look at the ball and know what's in front of you, everything that's in front of you." (P1)

The golfers also reported the use of the strategies in more general competitive situations. These include the beginning and end of the round and after a bad spell of holes. A further point of interest was that when golfers reported using imagery to help them plan the production of specific golf strokes, they often did so only in the vicinity of the golf ball. Participants 3 and 10 highlighted this.

"you can't think about the shot until you get there necessarily."(P5)

"20 or 30 yards before the ball I start to imagine the shot."(P10)

In contrast, when used independently of imagery, the use of self-talk was frequently reported after a bad shot/s and more interestingly when walking between shots. Participant 8 highlighted how he used self-talk when walking between shots stating:

"self-talk is almost between shots, keeping yourself calm in between shots, don't rush ahead, concentrate on this shot, don't get ahead of yourself."(P7)

There was however evidence against the notion that golfers would use self-talk continuously between shots with participant 4 stating:

"I mean if you're focussing completely all the time on the next shot from the end of the previous shot, it's a long time, it's too long really, you'd be mentally exhausted for four hours if you were really focussed." (P4)

Finally, a number of the golfers reported the use of imagery and self-talk together after the round as a means for helping them analyse their performance. The quote below illustrates this.

"A lot of the time you get stats sheets to fill in so when you finish you go through your round as you're using your imagery….as well just negative and positive self-talk depending on the way you've done." (P1)

Imagery use in relation to practice was only specified during practice and not before or afterwards. Although self-talk was also emphasised during practice, participant 5 discussed how he used the strategies before and after practice. The quotes below demonstrate this usage.

"You would have to sort of almost berate yourself to get yourself out the house you know you've got to practice you know that sort of thing motivate yourself really to go and practice." (P4)

"At the end of the practice session you might give yourself positive self talk because you've achieved what you were trying to do." (P4)

The data presented clearly demonstrates that imagery and self-talk, in combination and isolation, were widely reported in a variety of different scenarios. Key points of interest were that golfers mostly employed the strategies in combination, prior to the production of golf strokes as a means of planning how they were going to play the shot. The use of imagery was often emphasised only in the vicinity of the golf ball whereas self-talk was reported as being used, independently of imagery, when walking between shots as a means of regulating emotions and thoughts, although this usage was not continual. This suggests that contextual factors may be mediators of the functions that imagery and self-talk serve in combination and isolation.

4.3.2 Why golfers use imagery and self-talk in combination or isolation

The following two sections discuss the cognitive and motivational functions of imagery and self-talk in combination and isolation. The cognitive functions refer to when imagery and self-talk are used to serve technical and strategic functions. The motivational functions refer to when the strategies are used to serve mastery, anxiety control and motivational functions.

4.3.2.1 Cognitive functions

Figure 4.3 displays the cognitive functions of imagery and self-talk. It demonstrates that the strategies were used to serve a variety of technical and strategic functions.

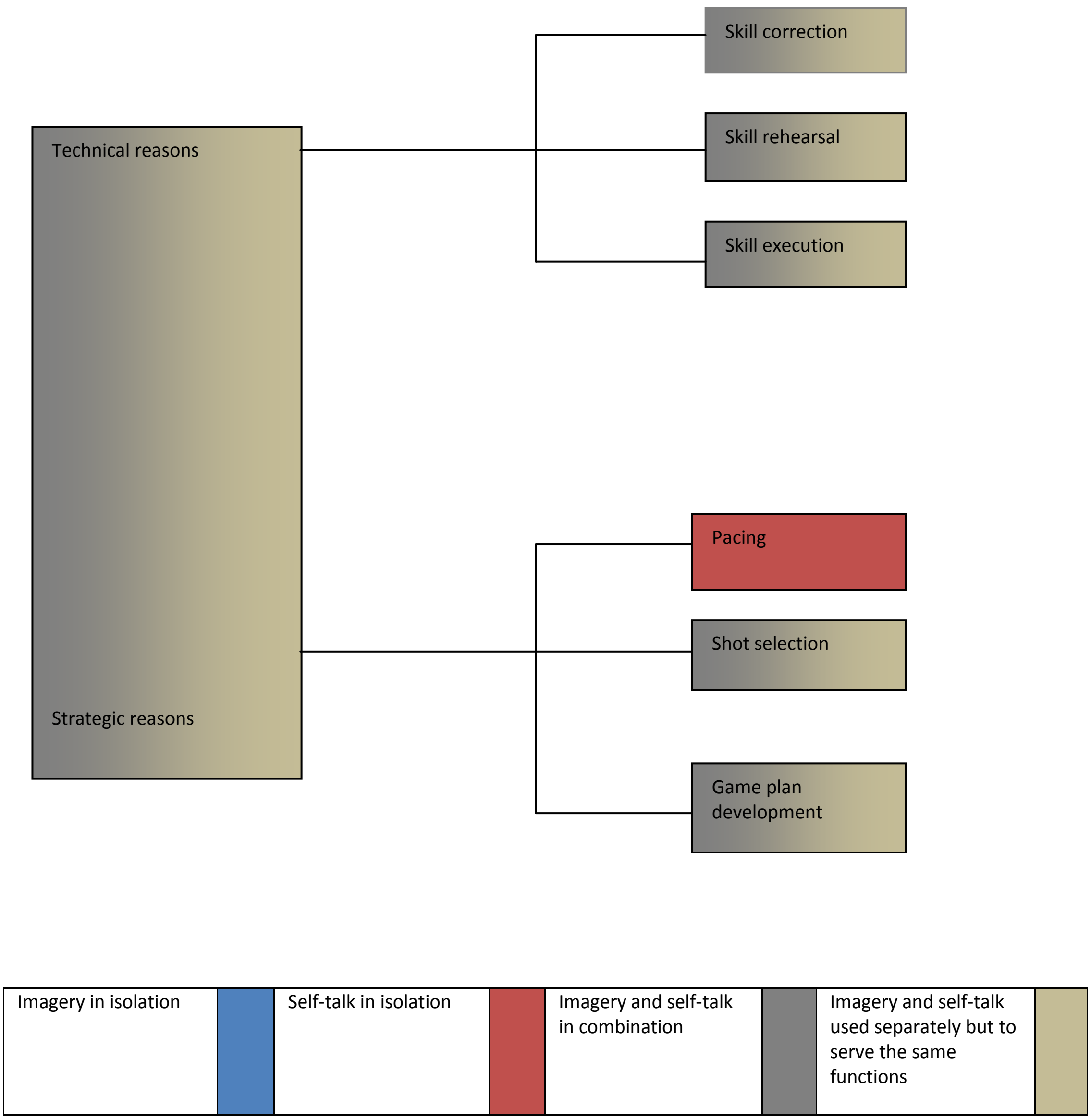


Figure 4.3: Cognitive functions imagery and self-talk

As can be seen from Figure 4.3, the golfers reported utilising both imagery and self-talk, independently and in combination, to serve a variety of technical and strategic functions. The technical functions of imagery and self-talk, in combination and isolation, included skill correction, skill rehearsal and skill execution. Whilst golfers discussed the use of imagery and self-talk, in combination and isolation, for serving all three of the technical functions, the importance of imagery in aiding the technical development of the golf swing was frequently referred to. More specifically, the use of kinaesthetic imagery was reported as being particularly important when serving this function. The participant quote below highlights how kinaesthetic imagery was central to the process.

"imagery is more of a feel thing to help you produce, because golf is repetitive stuff, you see what I mean, so you're trying to repeat your feelings over and over again." (P4)

Although self-talk was also used by some of the golfers to serve technical functions, others alluded to the suggestion that they sometimes actively avoided using self-talk for serving these technical functions during competition. This was because they wanted to avoid over-thinking the production of the skill. This suggestion has already been presented in section 4.3.1.1 and is demonstrated most clearly by participant 10 who stated,

"I probably use more self-talk in a practice round than I would in a competition in relation to technical aspects because you don't really want to be thinking about that much when you're playing in a competition." (P10)

The strategic functions of imagery and self-talk were widely reported by the golfers with many stating that they used the strategies, independently and in combination with one another, to facilitate the development of game plans and selection of appropriate strokes/shots. More specifically, many golfers suggested that the use of the strategies in combination was particularly important when planning shots. To highlight the importance of their combined use one participant argued:

"the two are most important probably planning a shot, where it's going to land and what it's going to do when it lands."(P10)

The way in which imagery and self-talk were used together in facilitating shot planning was particularly interesting. Golfers reported imagining a number of different shot options whilst using self-talk to adjust these imagined shots. They also used self-talk to create a clear verbalised account of what they had imagined, thus reiterating their plan to themselves.

"Again putting I might just tell myself where to hit it, or, say it's 2 cups to the right and have that in my mind and then after I've lined it up, I'll go for the feel, see how that feels stand over the ball and then just before I take my stroke I'll think 2 cups to the right, take a left at the hole and then I'll hit it." (P10)

"You look (imagined) at the shot and then you make a decision on it and that decision is your self-talk." (P1)

The only strategic function where self-talk was used, and imagery was not, was the pacing function. This, however, was only raised by one participant. Participant 8 illustrates how self-talk could be used to serve this function stating:

"the tendency when you're under a lot of pressure is to kind of rush a bit so I tell myself to slow down and don't walk too quick and things like that."(P7)

The key findings from this section were that the golfers widely emphasised the use of kinaesthetic imagery for facilitating the production of the golf swing. Furthermore, a number of the golfers indicated that self-talk was not fundamental, or in some cases beneficial, to the technical production of golf strokes as they were too fast and complex. In the most part, imagery and self-talk were used in combination to facilitate the planning of golf strokes. More specifically, when using the strategies to serve this function, the golfers reported adopting an external attentional imagery focus, from both internal and external imagery perspectives. Furthermore, the golfers emphasised the use of self-talk alongside this image to either reiterate what shot they intended to play or correct it.

4.3.2.2 Motivational functions

Figure 4.4 displays how imagery and self-talk were used in combination and isolation for serving mastery, anxiety control and motivational functions.

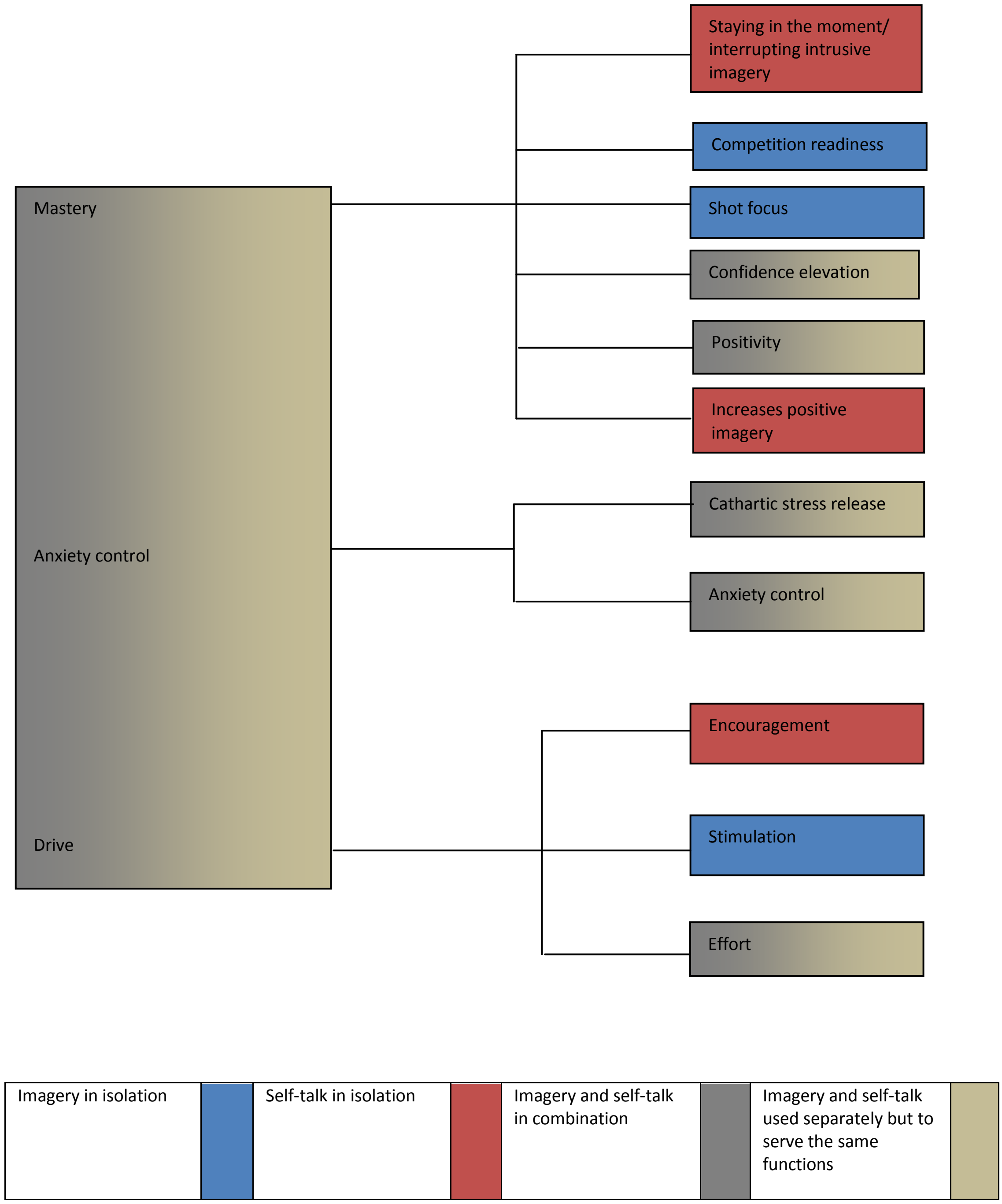


Figure 4.4: Motivational functions of imagery and self-talk

Imagery and self-talk were reported as serving a multitude of motivational functions in both combination and isolation. These motivational functions can be broadly categorised as mastery, anxiety control and drive functions. The mastery functions of imagery and self-talk in the literature typically refer to when the strategies are used to increase confidence, positivity, focus and mental toughness (Hardy *et al.*, 2001a; Munroe *et al.*, 2000). The golfers in the present study widely reported the use of both imagery and self-talk, separately and in combination, to increase positivity and confidence. When used in isolation imagery was used to aid shot focus and competitive readiness. The quotes below demonstrate the use of imagery for serving shot focus and competitive readiness functions.

"I suppose it (imagery) can do with putting a little bit. It gets you focussed doesn't it"(P1)

"When I'm practicing I would probably imagine how I would be playing so I'm hitting balls and trying to work on my technique but at the same time I'm probably transporting myself into a competition situation on the golf course you see what I mean so and that's it really so how I'm feeling and thinking at that point really." (P4)

Unlike imagery, self-talk was used to enable golfers to 'stay in the moment' and restructure any negative imagery and thoughts that they were experiencing between shots. The use of self-talk to increase positive imagery and 'stay in the moment' was particularly important to the golfers, with participant 7 stating

"if you had a hole where there might be trouble…you're almost imagining yourself hitting the ball over there (to a dangerous area)…you might just say 'come on' self-talking, 'let's focus on your target." (P7)

Imagery and self-talk were widely reported in combination to facilitate the elevation of confidence. Golfers reported the use of a multitude of different images to serve this function. Participant 1 discussed the different images that he used to increase his confidence.

"I do imagine being confident because it makes me confident. " (P1)

(Participant makes himself confident by) "Imagine the swing, the good shot and just do it basically." (P1)

Similarly, when the golfers reported using imagery and self-talk together to increase positivity they again reported the use of a number of different imagery types in these scenarios. The quotes below highlight this variation.

"You have got a difficult shot, you'll talk to yourself and you'll give yourself positives right I want it there and but then you'll imagine previous times when you've done that and the two combine well."(P1)

"Putting I definitely use them both together.....I'm kind of going through the mental image of the putt before I hit it so I'm visualising it and then I'm often saying to myself before I hit it putt to make it putt to make it.....I always say putt to make it so I kind of get really positive in my mind before I putt." (P7)

Along with using imagery and self-talk to serve mastery enhancing functions, golfers also reported their usage, both independently and together, as a method to control anxiety. A number of the golfers stated that they would not use the strategies to excite themselves as this could be detrimental to performance. Instead, they typically reported using the strategies as a means to exert control over anxiety. The form of anxiety that golfers used imagery and self-talk to control was predominantly cognitive in its nature. When used independently of self-talk, golfers reported using a variety of different images to exert control over their anxiety. The different quotes below highlight the images that golfers used to serve this function.

"at the moment I'm getting a bit more anxious and not as confident in my own game so I try and imagine what I used to be like. I go back to how I used to be like to give me confidence about how I would think in a certain situation." (P1)

" (in reference to the imagination of a golf stroke) It sort of gives you a little blanket, protects you from the nerves to an extent and I suppose, in the past when I've played my best golf I've been really calm and relaxed and on an even keel....I wouldn't let myself get too excited……too down." (P4)

"I suppose the first tee shot you could be quite nervous and you can imagine yourself maybe in a practice round where you've been doing the same shot, but it's not in competition, but you're still going off the first tee just to feel confident." (P10)

When used independently, self-talk was identified as being integral to the control of anxiety but, unlike imagery, was also used as a quick cathartic method to release stress and tension. To highlight its use in this way participant 3 stated *"it gets your tension out of you a little bit you know what I mean because frustration builds up and things like that so you give yourself a good bollocking then get on with it." (P3)*

Additionally, as with imagery, when self-talk was used to control anxiety, a variety of different contents were used to serve this function. The participant quotes below demonstrate this.

"If it's kind of a pressure situation erm I'll just be like one word or a couple of words or a small phrase….just if you're hitting a small chip or something in you just say to yourself, right all I've got to do is hit there and let the green do the rest like 2 yards left to the pin and that's it really. " (P10)

"Control stress yes, but arousal not so much because you have to keep relatively calm, I don't think you want to, you want to avoid the highs and lows……slow, calm, feel the shot you want." (P5)

As well as being used independently, imagery and self-talk were also used in combination to help control anxiety. Furthermore, in contrast with the imagery taxonomy, imagery types other than MG-A imagery were used alongside self-talk to serve this function. To highlight this participant 7 stated:

"I'd say it's maybe self-talk I use for that (nerve control) and maybe some imagery coming in. Well I think with putting when you're visualising the shot, the imagery definitely helps you it can calms you down because it helps you focus on the actual putt and not on the actual "am I going to hole, am I not going to hole it". It focuses you on being positive, so imagery does help with that you know the more positive you are, I think the more relaxed you are as well, so it does help really." (P7)

Furthermore, some golfers, although not all, highlighted the importance of self-talk over imagery to control their anxiety with participant 7 stating:

"I'm more aware of the self-talk calming myself down but the imagery probably does help at the same time." (P7)

Finally, the golfers also reported the use of imagery and self-talk, in both combination and isolation, to serve drive functions. These included effort, stimulation and encouragement.

Both strategies were used in conjunction and independently to increase effort. Furthermore, self-talk was specifically reported as serving encouragement functions and imagery was used to increase stimulation. There was some suggestion amongst some of the golfers that self-talk was more useful than imagery for providing encouragement to oneself particularly when walking between shots. Despite this a number of the golfers did report using imagery to increase effort and stimulation and reported the adoption of different imagery types to do this. One participant stated that he would imagine how bad it would feel to lose to motivate himself (Participant 1) and another reported that just imagining the production of the golf stroke made him more alert and motivated (Participant 5). Furthermore, the imagination of a particular outcome goal, which has previously been presented as the most appropriate imagery content for serving this function during competition was actually identified as a hindrance by some golfers. The quotes below illustrate this.

"you might be leading or whatever and you start thinking about an hour ahead, you know when you've won the tournament and you're making your winning speech or whatever, and it can really sort of tend to make you lose focus." (P4)

"If you're shooting a couple under par and you've got a good chance, and you know you've got a chance to win, I don't really imagine myself winning I don't think. I'll just keep plodding along with my score because obviously one shot could just ruin the whole round." (P10)

Participant 5 did state that the imagination of winning an event often occurred outside of the event and was more common when he was a child. Although self-talk was emphasised over imagery during competition for elevating motivation, some of the golfers did detail how the strategies could be used together to serve this function. For example, participant 1 stated:

"Occasionally you do think why am I bothering and when you look back to previously…..imagine yourself as you were at the time and talk positive self-talk and try and turn it around." (P1)

To conclude, findings revealed that golfers reported the use of imagery and self-talk, in combination and isolation, for serving a variety of mastery, anxiety control and motivational functions. Interestingly, a variety of imagery types were used either independently, or in combination with self-talk; in particular, the imagination of the execution of the golf stroke served in fulfilling a variety of motivational functions.

4.3.3 Using the strategies together to serve different functions

Although the preceding sections demonstrate how golfers used imagery and self-talk in combination and isolation for serving the same functions, a key finding was that numerous golfers reported using the strategies together to serve different functions. Specifically, a number of the golfers reported that they would use imagery to aid the selection of a shot whilst using self-talk to optimise their psychological state. The participant statements below highlight the use of the strategies in this way.

"when say you are visualising a putt, that gives you distance control which is a technical thing so I would say that's more technical and self-talk is more not so much motivational, sometimes motivational, but more of a calming effect."(P7)

"the self-talk really is trying to get yourself to, 'come on you can do this, you know how to do it, come on do it'. Obviously when I'm picturing the shot and executing it it's obviously you have to think before you hit the shot….you have to try and imagine where it's going and things like that."(P3)

These quotes clearly demonstrate how imagery and self-talk could be used together to serve different functions.

4.3.4 Preference for one strategy over the other

Whilst many of the golfers reporting using the strategies together to serve either the same or different functions, there was some suggestion amongst a small number of golfers that they had preferences for, or emphasised the use of, one strategy over the other. Participant 10 stated:

"I can imagine me not using that much self-talk and just using imagery. Whereas you've always got to imagine some sort of shot I suppose, or imagine the ball using some sort of direction and landing somewhere. So I can't imagine me not using any imagery and just using self-talk; it wouldn't work." (P10)

Additionally, some of the golfers alluded to the fact that they sometimes had different preferences for the use of the strategies, depending on what function needed serving and when it needed serving. These preferences have emerged throughout the preceding sections although the participant quotes below demonstrate them more clearly.

"Self-talk would kind of be the more motivational and kind of planning my round in the way that I might not hit certain shots here and there. I'd probably be talking to myself giving myself that information and when I'm hitting the shot it's probably imagery." (P10)

"I use self-talk more for sorting my psychological state out, I use both of them when it comes to my swing and I'm on the course I picture what it's supposed to be like and when I've got that right yeah that's it then." (P1)

"Self-talk is more of a motivational thing….more for analysing….imagery is more of a control to use under pressure….imagery is also a feel thing….because golf is repetitive stuff you see what I mean so you're trying to repeat your feelings over and over again." (P4)

"The technical kind of things it's kind of both but I think when I, but that's only if something's not technically working how it should be working. If I'm confident and I'm having a good round I'll probably be thinking more technically about the swing….using the imagery 80% and tiny 20% (ST) that kind of thing." (P10)

Despite these suggestions, the golfers were united in their belief that the two strategies worked well in combination.

4.3.5 The temporal patterning of combined imagery and self-talk use

When referring to the combined use of imagery and self-talk it is important to recognise that there was some variation in terms of their temporal patterning. To highlight this some of the golfers reported using imagery and self-talk together in combination whilst others stated that they found it impossible to do this and reported that there was a time lag between the use of the two strategies, i.e., they were used sequentially. This time lag was reported most when the strategies were used to facilitate shot selection. In particular, the golfers reported that the use of imagery often preceded self-talk use. This was also demonstrated in section 4.3.2.1. The participant quotes highlight this sequential use of the strategies.

"you see it and then you talk to yourself about it. You cannot talk to yourself before you see it." (P5)

Far fewer golfers reported using self-talk first followed by imagery, with only one participant outlining a scenario where this would happen:

"you could say to yourself, the wind's going to be affecting the ball it's going to go, right to left and then you could imagine the ball in the air and if it's not doing what you informed yourself it was going to do I suppose you could change it." (P10)

In addition there was some suggestion by some of the players that the strategies were used in close proximity but not together. Quotes from participants 4 and 1 highlight this

"you might use self-talk to motivate yourself to get out the house on a rainy day, then you might use imagery on the practice ground to help with the technique and the imagery to help you with your game plan, and then at the end of the practice session you might give yourself positive self-talk because you've achieved what you were trying to."(P4)

"I use them separately. Pre shot routine, obviously practice swings so technical, so I'm imagining it and then that comes after I've imagined the shot, I imagine the shot first and then select my club and then practice swings, technical, and then just before I'm stood over the ball, right deep breath and then you know 'right let's do it' and stand over it."(P1)

These quotes demonstrate clear individuality in the way in which golfers represent their use of imagery and self-talk in combination. However, the most commonly reported temporal patterning of the strategies was the use of imagery followed by self-talk to add clarity and correction.

4.4 Discussion

Findings from this investigation provided greater insight into the factors influencing golfers' use of imagery and self-talk in combination and isolation. In accordance with previous research, the golfers reported using both of the strategies in practice, competition and miscellaneous contexts with more being made of their use in competition (Hall *et al.*, 1990; Hardy *et al.*, 2001a; Hardy *et al.*, 2005a; Munroe *et al.*, 2000; Nordin & Cumming, 2005a). Previous authors have explained this common finding by suggesting that athletes place more emphasis on the use of imagery and self-talk for performance enhancement purposes than they do for the learning and execution of skills (Hall *et al.*, 1990; Hardy *et al.*, 2005a). Evidence for this suggestion was found in this study with the golfers reporting that their use of imagery and self-talk was far more technical in practice than in competition.

Further examination into the role that contextual factors played in golfers' use of imagery and self-talk in relation to competition revealed that they employed them, in combination and isolation, before, during and after competition. Moreover, more use was made of imagery and self-talk during competition rather than before or afterwards. This is in keeping with previous research into the contextual patterning of athletes' self-talk use (Hardy *et al.*, 2001; Hardy *et al.*, 2005a), but contrasts with much of the existing research into athletes' imagery use which has typically found that athletes predominantly employ imagery prior to competition (Hall *et al.*, 1990). Golfers' greater use of imagery during competition, compared with athletes from other sports, may be explained by the unique nature of golf as a sport. Golf is, by definition, a self paced sport (Boutcher & Zinsser, 1990; Singer, 2000) and, as such, players are afforded plenty of time to go through routines or rituals (Singer, 2000). These routines and rituals may include the use of psychological strategies. The finding that golfers employed imagery more widely during competition is of particular importance, as many imagery interventions in the extant literature are designed for use in the pre competition period (Callow *et al.*, 2001; Mellalieu *et al.*, 2009; Nicholls *et al.*, 2005c). As such, findings from this study highlight the need for research into the development of guidelines for imagery use during competition.

More in-depth examination of the role of contextual factors in imagery and self-talk use during competition revealed that both of the strategies were used widely, in combination and isolation, in a variety of different competitive situations. The use of both imagery and self-talk, independently and together, was most frequently reported in the vicinity of the golf ball prior to the execution of a variety of golf strokes. During this time period golfers reported imagining and talking themselves through the production of golf strokes to facilitate the selection of the most appropriate shot for the situation. Furthermore, whilst a few of the golfers reported the usage of imagery and self-talk prior to the production of every golf stroke, the majority reported employing them only when playing certain shots. For example, a number of the golfers emphasised the use of the strategies when they were challenged with difficult shots, others when putting and usage was consistently reported off the first tee. Golfers' employment of imagery and self-talk prior to the production of certain golf strokes only, was in direct contrast with existing recommendations that golfers should use them prior to every golf stroke as part of a pre-shot routine (Boutcher & Rotella, 1987). However, Bernier and Fournier (2010) recently found that golfers used imagery more on short shots. Whilst some of the golfers in the current study emphasised the use of imagery and self-talk on shots played onto the green, others did not, which suggested that there were wider functional requirements or task demands associated with the shots where they emphasised their usage. As such, further research was required to determine what the shared characteristics of these golf strokes were in order to provide an indication as to why the use of imagery and self-talk was warranted.

Along with golfers making more use of imagery and self-talk prior to the production of specific golf strokes, they also emphasised their use in more general competitive situations. Examples included the first few holes, when playing badly and last few holes of a competition. Furthermore, the use of self-talk, unlike imagery, was employed when walking between golf strokes. Previous research has generally failed to examine how golfers utilise psychological strategies before or after golf strokes with the focus often being placed only on the pre shot routine period (Hellström, 2009). It is widely acknowledged that the extensive amount of thinking time during the walk between shots in golf can lead to the onset of negative or inappropriate thoughts (Kirschenbaum *et al*., 1998; Nicholls *et al*., 2005a; Pates *et al*., 2001). With this in mind, a number of the golfers alluded to the fact that they used self-talk during this time to combat nervous thoughts and keep themselves calm and motivated.

The findings from this study appeared to suggest that context was a determinant of the functions served by imagery. This supported the first stage of Fournier *et al "s* (2008) model of imagery which presents situational demands as the primary directive of the functions served by the strategy. Whilst less attention has been paid to the role that contextual factors play in self-talk use, findings likewise indicated that they determined the functions served by the strategy. This appears to support an extension of Fournier *et al "s* model to include self-talk. Further examination is therefore required into the competitive situations where golfers emphasise the use of imagery and self-talk in combination and isolation.

Whilst contextual factors were found to influence the functions served by imagery and self-talk, the functional requirements themselves were in turn then found to influence athlete preferences for the use of the strategies and the way in which they were represented. To illustrate this, a number of the golfers stressed the importance of imagery over self-talk in serving technical functions. In particular, the use of kinaesthetic imagery was emphasised to facilitate the execution of the golf swing. This was unsurprising, given that golf is a sport based very much on 'feel' (Gallwey, 1979; Lee, 1998). It is likely that golfers emphasised the use of imagery for serving this function because, unlike self-talk, it can be used to replicate the ‘feel’ of shots and might also be less likely to cause the over conscious analysis of skills. Early proposals for the use of self-talk in golf suggested that golfers should use ‘swing’ statements during the pre-shot routine (Boutcher & Rotella, 1987; Cohn, Rotella, & Lloyd, 1990). It is however, now widely acknowledged that the overuse of internal technical self-talk prior to the production of skills can lead to performance decrements because it can lead to a reinvestment in the production of skills to a cognitive stage of learning (Mullen & Hardy, 2000; Zinsser *et al.*, 2010). This is, however, not an issue associated with the use of imagery. Furthermore, it has been suggested that imagery can invoke the autonomous execution of skills (Gallwey, 1979) which is of benefit to performance (Cohn, 1990; McCaffrey & Orlick, 1989). Consequently, given the issues associated with internal instructional self-talk, and the relationship that imagery usage shares with automaticity, is of little surprise that golfers demonstrated a preference for using kinaesthetic imagery when serving technical functions.

Although the golfers emphasised the use of imagery over self-talk for facilitating the execution of the golf swing, they widely reported the use of both of the strategies in combination to facilitate the selection of strokes/shots. When deciding upon which stroke/shot to play, the golfers widely reported adopting an external focus, from a variety of perspectives, to imagine different shot options, before selecting the most appropriate for the given situation. This finding replicates previous research by Bernier and Fournier (2010) but is unique in that the golfers in the current study reported using self-talk to both correct and affirm the stroke/shots that they were going to play. Kendall *et al.* (1990) previously suggested that self-talk should be used with imagery in this way. Moreover, the dual coding theory (Paivio, 1986) also lends theoretical support to the interaction between the strategies in this way. Paivio (1986) argued that for evaluative functions, such as selecting the most appropriate shot to play, self-talk could be used to invoke and manipulate images.

A further finding of interest regarding the use of the strategies in facilitating the selection of golf strokes was the process of ‘weighing-up’ the best shot to play. This is of particular relevance because imagery and self-talk scripts often do not permit athletes the flexibility to modify the skills that they have imagined. Instead, they are often instructed to imagine, or talk themselves through, one outcome. Weinberg *et al*. (2003) have previously suggested that there may be a need to move away from the use of such prescriptive imagery scripts, and the same may be true for self-talk, as athletes are presented with a wide and varying range of situations. There is however, limited evidence for this approach.

Imagery and self-talk, in combination and isolation, were also found to serve a variety of motivational functions. Firstly, both strategies were used in combination and isolation to increase drive and effort, although some of the golfers did emphasise the use of self-talk over imagery for serving this function during competition. This was in accordance with research conducted by Gammage *et al.* (2001) and Hardy *et al.* (2001a) which found that athletes and exercisers reported that motivational self-talk was one of the most widely applied self-talk types. A potential explanation for the emphasis that the golfers placed on self-talk for serving motivational functions during competition, may be that they find the use of motivational imagery during competition to be debilitative. Traditionally, it has been suggested that when an athlete is seeking to increase their motivation, they should imagine the outcome goal that they want to achieve (Hall *et al.*, 1998; Paivio, 1985). Although this seems like a logical and appealing proposition, golfers may actually find employing this mode of imagery during competition is harmful to performance. This is because, in accordance with previous research (McCaffrey & Orlick, 1989), findings from the current study revealed that golfers place great importance on ‘staying in the moment’ when playing golf. As such, although the use of MS imagery prior to competition may be beneficial, its use during competition may be unhelpful. Consequently, this may explain the golfers’ preference for using motivational self-talk during competition, as it is an effortless strategy which can provide quick encouragement whilst at the same time allowing golfers to ‘stay in the moment.’

As well as serving motivational functions, the golfers also reported the use of both strategies, independently and in combination during competition, to control anxiety and reduce stress. Previous research has found that golfers perceive being mentally calm and in control as central to performance (Cohn, 1990). There was considerable variation between the golfers in the way in which they used the strategies to control anxiety. For example, some of the golfers reported that the simple imagination of the stroke/shot could be used to control cognitive anxiety, whilst some placed more emphasis on the use of self-talk, and others reported using the two strategies in combination. Interestingly, the nature of the context was found to be influential in the way that the strategies were used to serve this function. When walking between shots, a number of the golfers reported using self-talk to control their anxiety suggesting that it was often difficult to control their imagery when under pressure in this situation. During this walking period, a number of the golfers alluded to the fact that they used self-talk to override negative imagery and thoughts. Earlier research by Cumming *et al.* (2006) lent support to the use of the strategy in this way when they found that facilitative self-talk could be used to combat debilitative imagery and self-talk. In contrast, when golfers experienced the onset of cognitive anxiety just prior to the execution of a golf stroke, they more frequently reported the simple imagination of the shot, in isolation or in combination with self-talk, to inoculate it. These findings appear to suggest that the ‘thinking time’ when walking between shots may be the determining factor in the different ways in which golfers employed imagery and self-talk to inoculate against anxiety.

Interestingly, it was also found that golfers emphasised the use of self-talk over imagery as a means to relieve stress. This finding is consistent with Van Raalte *et al.* (2000) who previously found that tennis players frequently used self-talk in this way after the production of a bad tennis stroke. It has been suggested that self-talk is a quicker and easier strategy to apply than imagery (Hardy *et al.*, 2005a). As such, when an instant release of stress is required after the production of a bad shot, golfers may prefer the use of self-talk.

Imagery and self-talk were found to serve an array of mastery functions although the golfers widely emphasised the role that the strategies, in combination and isolation, played in increasing positivity and confidence. Interestingly, the golfers reported employing a variety of different imagery and self-talk types for serving this function. For example, the simple imagination of a golf stroke before they played it was deemed to serve confidence enhancing functions in itself, as was telling themselves that they were going to be successful. These findings provide evidence to support the growing argument that there is considerable variation in the way in which athletes represent imagery (Nordin & Cumming, 2005a; Short *et al.*, 2004) and self-talk (Hardy, 2006) to serve different functions. Moreover, in accordance with the triple code theory (Ahsen, 1984) it is likely that the meaning that golfers attach to their images is more important than their specific content. It would appear logical to also apply these theoretical principles to self-talk (Hardy, 2006).

A particularly interesting finding from the current investigation was that a number of the golfers reported the usage of imagery and self-talk together to address two or more functions. For example, a number of the golfers reported using imagery to plan golf strokes whilst at the same time, using self-talk to maintain their psychological state. This was of importance as much of the rationale for combining the strategies in the past has been based on the suggestion that they could work well together in serving the same functions (Hardy *et al.*, 2001a). This finding may have potential practical implications, as with further research, sport psychologists may be able to recommend the use of the strategies in this way.

The influence of functional requirements on golfers' use of imagery and self-talk supported the second stage of Fournier *et al "s* model of imagery (2008). This stage proposes that the functions served by imagery determine preferences for the way in which images are represented. Findings from this study once again supported a further extension of this theoretical model to encompass self-talk, as preferences for imagery and self-talk use in combination and isolation were formed depending on the function being served and the way in which the strategies would need to be represented to serve them.

The final finding of interest was that the temporal patterning of the golfers' combined imagery and self-talk use was not as 'straight forward' as has been alluded to in the extant literature (Cumming *et al.*, 2006; Hall *et al.*, 1997). In the few studies that have examined the performance effects associated with the 'combined' use of imagery and self-talk, the participants were simply told to employ the strategies together. However, findings from the present study revealed that a number of the golfers, particularly when planning shots, frequently used imagery first closely followed by the use of self-talk. As referred to in the review of literature, this sequential use of the strategies is supported by Paivio's dual coding theory (1971), which argues that activity in either the verbal or visual channels can induce activity in the other as they are interconnected. Again, this finding may have implications for sport psychologists who recommend the simultaneous combined use of the strategies.

Although the findings from this investigation were illuminating, there was a key limitation associated with it. Upon analysing the data, the decision was taken to only present the responses from the skilled golfers, as the less skilled golfers failed to discuss their usage of the strategies in sufficient depth. As such, the data presented were based only on seven golfers' responses. This does raise concerns as conclusions were made based on a small number of participants. However, it must be noted that follow up interviews were undertaken to ensure that sufficient depth was achieved. Furthermore, the emergence of common and recurring themes indicated that theoretical saturation had been attained. The underlying purpose of qualitative research is to achieve a rich depth and understanding of a phenomenon and the current study achieved this.

To conclude, in line with the aims of this thesis, this investigation provided greater insight into the factors influencing golfers' usage of imagery and self-talk in combination and isolation. Key findings included that the golfers widely reported the use of self-talk between shots, emphasising its use over imagery, as a strategy to relieve tension, increase motivation and control negative images and thoughts. In contrast, both of the strategies were widely employed in combination in the vicinity of the golf ball prior to the execution of only certain golf strokes in certain situations. In these situations golfers imagined a variety of shot options whilst using self-talk to correct and add clarity to these images. The use of imagery and self-talk to facilitate shot planning was found to be multifunctional with golfers suggesting that the use of the strategies in this way could also optimise their psychological state.

Findings indicate that the golfers' use of imagery and self-talk was influenced by the situation and the resultant functions that need serving. It is widely acknowledged that imagery use is influenced by contextual factors (Bernier & Fournier, 2008; Martin *et al.*, 1999; Munroe *et al.*, 2000), although there is less understanding as to how these factors affect self-talk use. To date little research has examined the interrelations between when, what and why golfers use imagery and self-talk, with the different components often being examined in isolation. This is of concern, as findings from the current study appear to suggest that the use of the strategies may be inextricably linked by these three factors. As such, further research is required to examine the role that contextual factors play in imagery and self-talk use. Consequently, based on the findings from the present study, further research was warranted to gain specific detail about the nature of the competitive situations where golfers applied the use of the imagery and self-talk, to create a platform for future studies. This understanding was of particular importance because the golfers' employment of the imagery and self-talk was in direct opposition to the extant recommendations that they should be used prior to the production of every golf stroke (Boutcher & Rotella, 1987; Cohn *et al.*, 1990). This indicated that the strategies were not being used as part of a consistent pre-shot routine but were rather being employed to serve wider functional or task demand requirements. As such, the shared characteristics of the situations where golfers emphasised the use of imagery and self-talk needed to be ascertained to enable greater understanding about the factors influencing golfers' usage of the strategies, and the functions that they serve.

5. Study 3: Part A

The nature of the competitive situations where golfers emphasise the use of imagery and self-talk

5.1 Introduction

The purpose of study two was to examine how golfers used imagery and self-talk in combination and isolation. In particular, the impact of contextual factors and functional requirements on the use of imagery and self-talk was examined, as was the temporal patterning of the strategies when they were used together.

Key findings from study two included that golfers used imagery and self-talk in both combination and isolation to serve a variety of cognitive and motivational functions. Additionally, in agreement with results from study one, golfers were found to employ imagery and self-talk more in competition than practice. Moreover, rather than employing the strategies continuously throughout competition golfers were found to emphasise their use in certain competitive situations. Examples of such situations included the first tee, a difficult shot and the last few holes of competition. Of greater interest however, was that there was evidence to suggest that the context and the functions served by imagery and self-talk were interdependent, with context found to influence golfers' use of imagery and self-talk and the functions that they served. This was because the situation that golfers were presented with led to the use of the strategies in certain ways to serve certain functions. To exemplify this, golfers reported that the walk between shots could be a stress invoking experience. Hence, they reported using self-talk at this time to alleviate stress through the use of statements such as 'calm' and 'relax.' However, during the immediate pre-shot routine period, prior to the execution of certain golf strokes (putts, difficult shots, shots towards the end of the round), golfers reported using imagery and self-talk together to plan the shot. In order to do this, they reported imagining different stroke options and supplemented the use of these images with self-talk to both reaffirm and correct them. The use of the strategies in this way was perceived as not only facilitating the planning of golf strokes but also the regulation of emotions.

Findings from study two revealed that golfers emphasised the use of imagery and self-talk in two types of situations. These were skill specific and more general competitive situations. Skill specific contexts pertained to the use of the strategies in response to a variety of different golf strokes. These included tee shots, the first tee shot, difficult shots, pitch shots and putts. The general competitive situations where golfers emphasised the use of imagery and self-talk included the beginning and end of a round, when walking between shots and when playing badly. Although findings from study two provided insightful information into how golfers used the strategies during competition, the fact that they emphasised their use when playing certain shots (tee shot, putting, difficult shots etc), or under certain general conditions (beginning of the round, playing badly, end of the round) raised a number of important questions: Why were golfers emphasising the use of the strategies in these situations? Were there any shared characteristics associated with these situations that influenced the use of the strategies? When golfers emphasised the use of the strategies in more general competitive situations, when were they specifically employing them?

Owing to both studies one and two finding context to be the predominant determinant of imagery and self-talk usage, these questions needed to be answered to enable understanding of what was driving golfers' usage of the strategies. This information could then be used to provide an indication as to the functions that they were serving or the requirements that they were fulfilling; subsequently allowing for the relationship between context, function and the types of imagery and self-talk used to be more successfully examined. Therefore, the purpose of part A of this study was to identify the commonality between the situations where golfers emphasised the use of imagery and self-talk. The intention was that findings from part A of this study could then be used to inform the development of a questionnaire that would examine the relationship between context, resultant functions and the types of imagery and self-talk used.

Understanding the characteristics of the situations where golfers emphasised the use of imagery and self-talk was of particular importance because to date recommendations for the use of the strategies have proposed that they should be used prior to the execution of every golf stroke (Boutcher & Rotella, 1987; Cohn *et al*., 1990). Moreover, many imagery and self-talk interventions for golf specifically have tended to focus only on equipping golfers with strategies to use during the immediate pre-shot routine (Beauchamp, Halliwell, Fournier, & Koestner, 1996; Harvey *et al.*, 2002). These existing recommendations for imagery and self-talk usage during golf competition are intuitively appealing but are problematic for several reasons. Firstly, as has already been discussed, findings from study two demonstrated that golfers do not necessarily employ imagery and self-talk prior to the execution of every golf stroke. This suggests that there might be a functional requirement, or task demand, associated with the situations in which they are employed that warrant their usage. Secondly, a round of golf lasts approximately four hours and much of the time is spent walking between shots rather than executing them (Magnusson, 1998; Parkkari, Natri, Kannus, Manttari, Laukkanen *et al.*, 2000). Consequently, the lack of research into golfers' use of imagery and self-talk at any time points outside of the immediate pre-shot routine period suggests that understanding as to how they should be applied in golf is limited and warrants further consideration (Hellström, 2009). Finally, and most importantly, research conducted over the course of the last decade has consistently indicated that situational factors are the predominant determinant of imagery function and subsequent content and characteristics (Bernier & Fournier, 2010; Fournier *et al.*, 2008; Nordin & Cumming, 2005a). Whilst there is less understanding of how contextual factors affect athletes' use of self-talk there is evidence to suggest, as with imagery, that context determines self-talk content and function (Hardy *et al.*, 2001; Hardy *et al.*, 2005a). Given the role that contextual factors have been found to play in the use of the strategies it was of importance to determine the nature of the situations that invoked their use.

The research profiled supports the importance of understanding the role that contextual factors play in golfers' use of imagery and self-talk. In order to form the basis for further study into this relationship, the purpose of part A of this study was to gain specific detail about the situations in which skilled golfers applied imagery and self-talk during competitive rounds of golf. The intention was that findings from part A of this study could be used to inform the development of a questionnaire that would examine the association between context, functions and the types of imagery and self-talk used by golfers. Consequently the purpose of part A of this study was twofold. It sought to a) identify in greater detail the characteristics of general situations and specific shots where imagery and self-talk use were emphasised to provide an indication of the functions that they were serving and b) gain more detail about when the strategies were specifically employed within the general situations.

5.2 Method

5.2.1 Design

A qualitative research approach was deemed to be the most appropriate for gaining further insight into the competition contexts where golfers employed imagery and self-talk, in combination and isolation. There were two reasons for the adoption of this approach. Firstly, a qualitative approach is particularly useful when a 'rich description' of a topic area is required (Denzin & Lincoln, 1994). Secondly, and of most importance to the current study, it enables detailed information to be gained about the role contextual factors play in athletes' experiences (Strean, 1998).

Data were collected through a focus group method, which has grown in popularity in recent years in sport psychology research (Cote, 1999; Giacobbi, Lynn, Wetherington, Jenkins, Bodendorf, & Langley, 2004; Vazou, Ntoumanis, & Duda, 2005). A focus group involves a researcher bringing together a sample of a population of interest to discuss a relevant topic; the researcher is central to the process and guides the discussion of the participants (Lunt & Livingstone, 1996). Focus groups are more structured than discussions as the researcher usually has a set of interview questions that guides the discussion (Patton, 2002) (see appendix 11 for interview schedule). Two of the many benefits of focus groups are that members of the group can interact with one another to ‘spark’ thoughts and discussions and shared viewpoints can be gained quickly (Patton, 2002). Moreover, focus groups are particularly useful when researchers are seeking to develop surveys or questionnaires (Morgan, 1997). This is because commonality in responses can be gained quickly to aid the generation of questionnaire items. This was of particular relevance to this phase of the study as its purpose was to generate further understanding about the nature of the situations where golfers used imagery and self-talk, to aid the creation of contextual items for a questionnaire examining the relationship between context, function and the use of different imagery and self-talk types.

5.2.2 Participants

Upon gaining ethical approval from the school ethics committee, five male category one golfers (Mean age = 20.8 ± SD, 1.1, mean handicap = 3.2 ± 1.7) were recruited to take part in a focus group. All of the golfers were recruited from the same University golf team. Initial contact was made with the captain who then invited his fellow golfers to attend a focus group. The golfers were highly skilled amateurs who had competed in county, regional and scratch competitions. Only highly skilled golfers were recruited, as previous research has found that highly skilled athletes use imagery and self-talk more widely in competitions than less skilled athletes (Hall *et al.*, 1990; Hardy *et al.*, 2004). Additionally, findings from study two revealed that the highly skilled golfers were more aware, and able to talk about their use of imagery and self-talk, than less skilled golfers.

5.2.3 Procedure

Upon arriving at the focus group appointment, all participants were provided with an information sheet (Appendix 12) and a consent form. The information sheet detailed the purpose of the study whilst also informing the golfers that the interview would be recorded. They were however told that their data would be confidential and anonymous. Definitions of imagery and self-talk were then provided to the golfers as specified below:

"Imagery, often referred to as visualisation, is the creation or recreation of events or scenarios without physically performing them e.g. a golfer may imagine winning a tournament or performing a specific golf stroke."

"Self-talk refers to the dialogue that a person has with themselves either outloud or in their head e.g. a golfer may provide themselves with instructions or talk to themselves to motivate them."

These definitions were based on those used by Vealey and Greenleaf (2006) and Theodorakis *et al*. (2000) respectively. Once the golfers had noted the definitions, read the participant information document and provided their informed consent, they took part in the focus group. This was conducted at the golfers' university clubhouse to encourage comfort and familiarity in the process (Rubin & Rubin, 1995). The interview was semi-structured to ensure that individual experiences were fully captured (Dale, 1996). The interview guide used was created based on the findings from study two and specifically sought to gain more in-depth information about the characteristics of the situations where golfers emphasised the use of imagery and self-talk. The focus group began with the researcher gaining some basic information from the golfers (handicap, where they played and competitive standard). This served two purposes: firstly to gain descriptive information for all of the participants and secondly to invoke conversation and a relaxed atmosphere. Rubin and Rubin (1995) suggested that the interviewing process is most effective when participants feel comfortable and recommend the use of a general conversation at the start of an interview process as a means for achieving these states.

After this general discussion, an opening question was posed that asked golfers when, during a competition, they would use imagery. This question in relation to self-talk was then asked. The purpose of these questions was to generate discussion and create a platform for more complex questioning. As part of the discussion golfers were probed on their use of imagery and self-talk in the ten situations that had emerged as key in study two. These situations were split into skill specific and general situations. Skill situations included the first tee shot, every tee shot, difficult shots, putting and chipping. General situations included the first few holes of competition, starting a competitive round poorly, a series of bad holes, immediately after a bad shot and walking between shots.

In order to ascertain key common elements across the ten situations, the golfers were asked to discuss what characterised them and how they felt when they were presented with them. Golfers were also asked when and why specifically within each situation they would employ the use of the strategies. For the skill specific situations, golfers were asked to provide specific detail about their employment of the strategies around the skill. For example questions pertaining to putting asked golfers whether they used the strategies prior to all putts or whether their use was emphasised on specific putts. For the more general situations golfers were asked whether there were any particular shots within them where they would emphasise the use of the strategies more. Golfers were encouraged to speak freely about these topics and quieter members of the group were drawn into the discussion when necessary (Patton, 2002). At the end of the interview golfers were encouraged to raise any other situations where they emphasised the use of imagery and self-talk. Upon conclusion of the focus group all participants were issued with a participant debrief document (Appendix 13).

5.2.4 Data Analysis and data quality

Data were transcribed verbatim and then content analysed using the guidelines presented by Côte *et al.* (1993) in section 4.2.4. Inductive analysis was used during the initial stage of coding and then deductive analysis was used for the formation of more abstract themes. The purpose of this method of analysis was to create general categories and themes pertaining to the characteristics of the situations where golfers used imagery and self-talk, and when they specifically employed them.

Data quality was ensured using the thick description and peer debriefing methods outlined in section 4.2.5. Collectively these methods served in confirming the transferability, confirmability, credibility and dependability of the data (Lincoln & Guba, 1985).

5.3 Results

The results are presented in four distinct sections. The first section provides detail about the nature of the situations during a competitive round of golf where golfers did not emphasise the use of imagery and self-talk. The second and third focus on those situations where imagery and self-talk were used. The second section specifically, presents the characteristics of the shots where golfers used imagery and self-talk. The third section details the general situations during a round of golf where golfers employed the strategies. The characteristics of the situations and specific information about when the strategies were employed during these time frames is provided. The final section presents an overview of when the golfers used the strategies in relation to the execution of golf strokes. Specifically, this section presents information on how golfers used imagery and self-talk leading up to the execution of golf strokes.

5.3.1 Processes associated with playing well or 'straight-forward' shots

Before discussing the common characteristics of the situations where golfers used imagery and self-talk it is useful to provide an overview of the situations where they did not use them. A number of golfers reported routinely employing imagery and self-talk prior to the execution of golf strokes. However, when playing well or playing 'straight-forward' shots, a number of them argued that they were either, not aware of using imagery and self-talk, or, that they used the strategies minimally. The participant quotes below demonstrate the thought processes associated with playing well, or the performance of 'straight-forward' shots.

"If you're playing well as P3 said you might not be thinking about it (self-talk) at all." (P5)

"when you play good, things tend to happen by themselves."(P4)

"Straightforward shots don't really use it that much" (P3)

"if you're walking and you're playing well you're just talking to people and chilling out." (P3)

"once you get going it happens automatically because you're into the game all the time." (P4)

Findings appeared to suggest that when playing well or when there was minimal pressure, golfers reported either completely autonomous play or the automatic or minimal usage of imagery and self-talk as there was no need for them. In addition to the subconscious processes experienced a number of the golfers were aware of their usage of imagery and self-talk but did report focussing on, and using the strategies 'more,' in particular situations. These will be discussed further in the following sections.

5.3.2 Prior to the execution of golf strokes

In line with findings from study two, golfers' use of either one or both of the strategies largely centred around the execution of a variety of golf strokes. Moreover, in contrast with the previous section usage of the strategies occurred, and were more actively applied, in response to complex, difficult or more pressurising golf strokes. When presented with these golf strokes golfers reported actively analysing the situation, with the use of imagery and self-talk, rather than performing the skills automatically. Figure 5.1 illustrates all of the specific shot types where golfers emphasised the use of imagery and/or self-talk. Figure 5.1 also presents the characteristics of these golf strokes.

Specific golf strokes where golfers' use imagery and/or self-talk

- **Most shots, pre-shot routines** (more important when playing badly)

- **Tee shots** (important)
  - On every tee shot
  - On difficult tee shots

- **Difficult shots** (adds pressure)
  - Second shot
  - Narrow tee shot
  - When playing badly
  - Pitch shots

- **Putts**
  - Most putts
  - 6 foot putts
  - Putting when over par or playing badly (Important, more focus)
  - Putting at the start of the round (Important)
  - Putting towards the end of the round (more pressurised)
  - Greater use if putting to win a competition
  - Putting to save par

- **Pitch shots**
  - Every chip shot (precision play)
  - Weak side of the game (stressful)
  - First few holes of competition (important to get feel for them)

- **Long shots** (full swing, more complex than putts and pitches)

Analysis rather than autonomous

Figure 5.1: Shots where golfers use imagery and self-talk

There was considerable variation between the golfers in terms of prior to which golf strokes they employed imagery and/or self-talk. For example, two of the golfers reported using the strategies prior to the production of all long shots, whilst others emphasised the use of the strategies on shorter pitch shots. A finding of particular importance, which will be covered in section 5.3.3, was that the use of the strategies before the production of certain golf strokes was a function of either the individual's perception about the golf stroke itself, or the general situation in which they were producing the golf stroke. For example, the majority of the golfers said that the first tee shot was important because it, in itself, affected the rest of the competition. The participant quote below demonstrates the importance placed on the tee shot itself.

"a lot of the time how you hit the first tee shot, say if you hit a good drive might determine a lot of your confidence for the rest of the tee shots….on the first tee shot it's important to get a good one." (P3)

Moreover participant 4 explained why the use of imagery and self-talk was so important on this golf stroke

"most of the time you're a bit extra nervous teeing off first, especially if it's a big competition, before you get properly warmed up and into the game so it might be good to get calm....get a few extra nerves away." (P4)

In general, golfers' approaches to the use of imagery and self-talk in response to putting and general tee shots were a function of situational factors. For example, the golfers generally stated that they did not find putting stressful in itself. However, under certain conditions, for example when putting at the beginning of a round and when playing badly or towards the end of a competition when winning, they found the execution of the skill more important and stressful and consequently actively applied more focus on the use of imagery and self-talk in these situations. The following participant quotes demonstrate this point clearly

"it depends if it was to win the competition or the match or something or it might be just if you had had a poor round or something (a poor round) would be more pressurised so you would probably use self-talk and imagery." (P2)

"If you're under par it will be more of a natural thing, whereas if you're a couple over like P1 said you will be focussing more on making the putts."(P3)

The experience of stress appeared to result from either the shot type itself or the situation that the shot was being executed under. For example, both participants 4 and 3 reported experiencing difficulty with their pitching at the time of this study. Consequently, they both reported using the strategies 'more' when executing this skill.

"Before pitching that bit of extra visualisation for where you want to land the ball because obviously with pitching and chipping it's more precision. There's no power at all it's just about precision.....it's always been a weak side of my game the pitching and chipping so for me it's quite stressful. Sometimes I'm trying to tell myself I can do it and that so I get confident again." (P4)

"I'm struggling at the moment with pitching so I kind of talk myself through the technical side of it as well. I do pay extra attention and I do imagine a bit more, tell yourself you can do it." (P3)

In contrast, the influence of external factors was apparent in the execution of tee shots. Despite two of the golfers (P1, 5) indicating that the use of imagery and self-talk was important on all tee shots, participants 4 and 2 argued that the level of difficulty of the tee shot dictated whether they would use the strategies at this stage. The quotes below demonstrate this relationship.

"I think, it depends on the difficulty, if you've got a big wide fairway, you might just step up and try and hit it hard. So you might just stick it miles down the fairway, but if it's more position play you might look at where the pin is, see which side of fairway you need to be on. I think you're probably seeing where you want it go but telling yourself. So 'left side of the fairway' and as you say that the chances are as you're saying that you will be looking down the left side of the fairway. The tee shot goes the furthest, so it does set up the rest of your hole." (P3)

"I probably use self-talk if there's a hazard in the middle of the fairway or something I'll try and stay away from them." (P2)

As well as the difficulty of the tee shot being a determinant of imagery and self-talk use, the golfers were found to emphasise the use of the strategies in response to difficult shots in general. There were indications that the presentation of a difficult shot led to elevations in perceptions of stress. It must be noted that there was considerable variation between the golfers in terms of what they deemed to be a difficult shot. The participant quotes below demonstrate this variability.

"if there's a hazard in the middle of the fairway." (P2)

"You might have to go around a tree or something or you might have to fade the ball" (P3)

"if it's a narrow tee shot then obviously the shot's the difficult shot." (P4)

"it depends where you put yourself off the tee, I think your second shot is probably, the second shot is probably the shot that is affected most like the difficulty increases if you've hit a bad tee shot." (P3)

"when you might have to go around a tree or something or you might have to fade it or draw the ball you kind of imagine it maybes if you have to keep it low, imagine the height of the ball.....it's just in the pre-shot routine" (P3)

The findings demonstrate that golfers emphasised the use of imagery and self-talk, and actively placed most focus on their usage, in response to particular golf strokes under stressful conditions. Furthermore, the use of the strategies was either a function of the shot type itself or the situation in which they were producing the shot.

5.3.3 Situational factors that influenced imagery and/or self-talk use

Section 5.3.2 demonstrated that golfers' use of imagery and self–talk centred on the execution of a variety of specific golf strokes. Furthermore, it indicated that the use of the strategies could be either a function of the shot itself (e.g., shot difficulty), or the general situation that the shot was being produced in (e.g., putting to win). The following section provides more specific information about the nature of the situations where golfers emphasised the use of imagery and self-talk and more actively employed them. Figure 5.2 highlights the specific time points within these general situations where golfers reported the use of imagery and self-talk and how they characterised these situations.

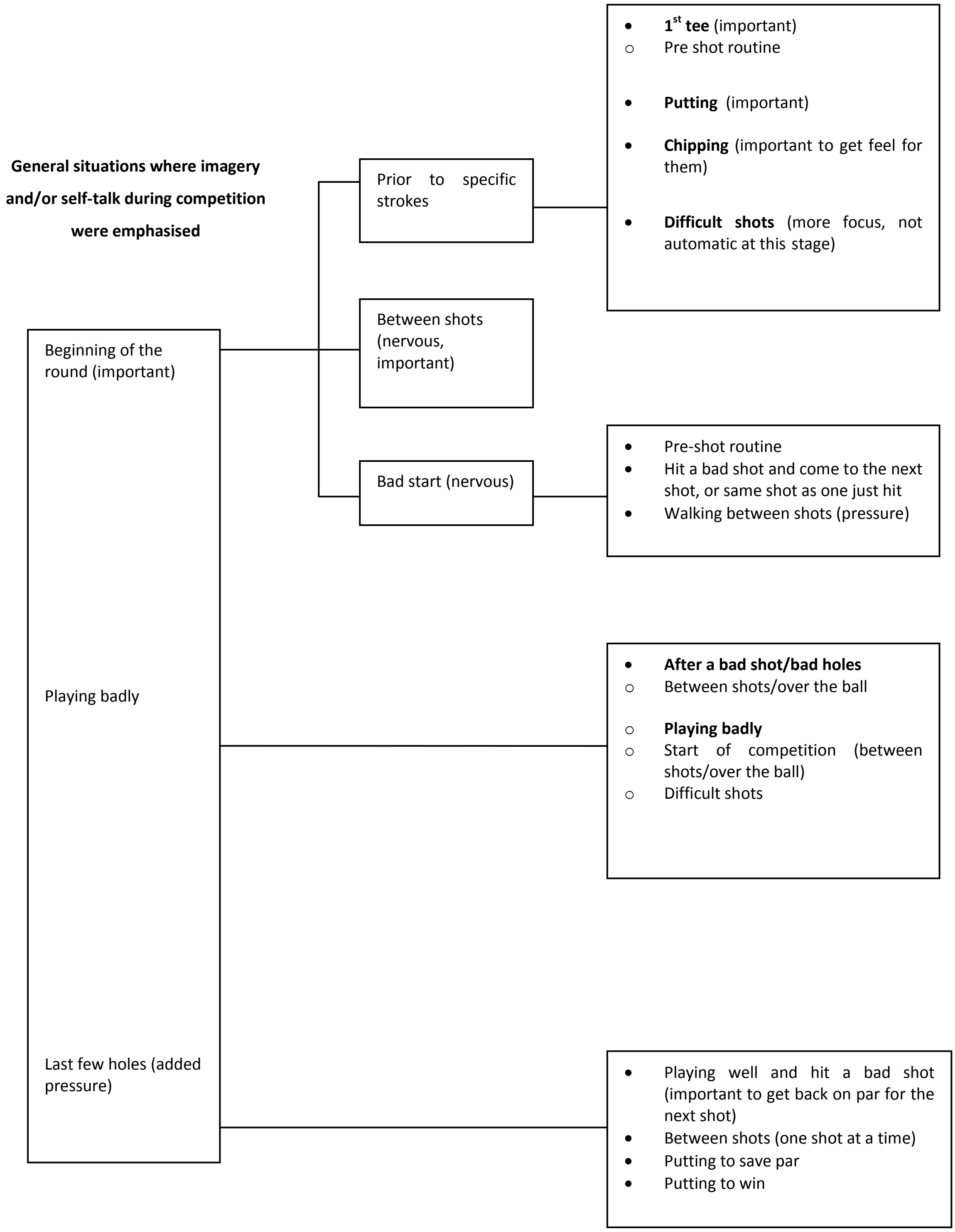


Figure 5.2: General situations where golfers use imagery and self-talk

There were three general situations where golfers reported a greater emphasis on the use of imagery and self-talk. These included the beginning of the round, when playing badly or during the last few holes of competition. These general situations appeared to impact upon golfers' use of the strategies during the approach to, and preparation for, golf strokes. Participant 3 highlighted the characteristics of the beginning of a round and why the use of the strategies was necessary at this point.

"I think it's everyone just wants a good start....you tend to pay more attention at the start, personally I want to get a good start." (P3)

During the beginning of the round the golfers reported using the strategies in relation to a variety of specific golf strokes. The importance of the first tee has already been discussed in section 5.3.2, although the golfers also reported that they placed more emphasis on the use of the strategies in relation to putting, chipping and difficult shots at the beginning of the round. Additionally, the golfers argued that the use of the strategies was important during the beginning of a round after a bad shot had been played. Participant 5 demonstrated how the execution of a bad shot affected the use of the strategies prior to the production of the next shot with which they were presented.

"I think it just depends on the start that you have. If you get off to a good start in the first couple of holes I won't necessarily think about much, and I won't be worrying about stuff, I'll just be getting down and hitting it, and that's probably when I'll start shooting better scores. Whereas if you've maybe had a bogey or something or you've hit a bad tee shot in the first hole or whatever, it's always on your mind so you might start thinking about stuff and giving yourself information. When you're over it if you'd hit a bad tee shot and then you come to the second hole you might be thinking that something went wrong and then you'll be giving yourself instructional information. Right I need to do this to stop that happening." (P5)

Playing badly in general, regardless of whether it was the beginning or end of the round, led to greater emphasis placed on the use of imagery and self-talk in competition. More specifically, the golfers reported the use of one or both of the strategies after the production of one bad shot, or a series of bad shots. Participant 1 provided some insight into what a bad shot was:

"I've missed where I was aiming by like 20 foot or something, like that if I've hooked it too much….just generally a bad shot."(P1)

An example of a series of bad shots was described as bogeying a few holes (P2). The negative characteristics associated with playing a bad shot or series of shots were that the golfers could find themselves 'getting down' (P1), starting to rush their game (P4) or becoming disengaged (P3). After the production of a bad shot, the golfers reported using either one or both of the strategies when walking towards, and standing in front of the next shot. The participant quotes below demonstrate how the strategies would be used during these time points.

"I tend to get ahead of myself a bit when I play bad……I use quite a bit of self-talk between shots to try and get myself confident again… that would mostly be between shots after a bad spell of holes." (P4)

"Maybe if you've bogeyed a few holes, you know because if it's the same mistake every time, then you might use self-talk to stop you doing the same action again…..probably between shots and then over the ball."(P2)

"I think if I'm playing worse then I kind of concentrate harder and I really think about what I'm doing and the putts going to break to try and make it." (P1)

"if you're walking and you're playing well you're just talking to people and chilling out but if you're playing bad you tend to focus more on things." (P3)

The execution of a bad shot or shots appeared to impact negatively upon the golfers and their primary concern was to ensure that they could correct their psychological state for the production of the next shot.

Finally towards the end of the round either one or both of the strategies was emphasised. The use of the strategies in relation to putting towards the end of a round and 'pressure' shots, where par had to be saved, were emphasised in this instance. The use of self-talk was also emphasised when walking between shots towards the end of the round.

"I do quite a bit of self-talk in between shots….just trying to stay in the present because obviously you know extra pressure adds on in the last couple of holes….if you're close to winning or if you just want to get into the clubhouse because you're playing bad still just trying to focus on every shot." (P4)

It was evident that the strategies were emphasised, and more actively employed, at time points where additional pressure was placed on the golfers. Given that the use of imagery and self-talk was largely arranged around the performance of golf strokes, it may be possible that these pressure situations just emphasised the need to use psychological strategies when preparing to execute shots. This was in contrast to the experience of playing well. When playing well the golfers reported applying the strategies with minimal thought. Moreover, some of the golfers reported having minimal thoughts all together.

5.3.4 Golfers' use of imagery and self-talk leading up to the execution of golf strokes

In addition to understanding the nature of the situations where golfers used imagery and self-talk it was important to understand when they specifically used the strategies within these time frames. For example, due to the findings from the extant literature suggesting that the strategies may be applied outside of the immediate pre-shot routine period, further understanding was required. It was apparent that during competition imagery and self-talk use was centred around the execution of specific golf strokes under varying conditions. Moreover, findings indicated that golfers used the strategies during both the approach to, and immediate preparation for, executing the golf strokes. The quotes below demonstrate how the strategies were used between shots

"I'd use self-talk on pressurised shots....over the ball and walking to the hole." (P2)

"I use self-talk after I've hit a bad shot just to kind of stop myself getting really down and I just kind of think about the next shot." (P1)

"you've hit a drive and you're walking to your ball, when you're walking to it you do tend to use imagery, see the shot ahead of you." (P3)

Golfers' use of the strategies between shots appeared to be employed as a means for facilitating the next golf stroke that they were presented with. This indicates that golfers' use of the strategies may be progressive from the walk towards the hole to the immediate preparation to execute golf strokes.

5.4 Discussion

As previously stated the purpose of part A of this study was to gain specific detail about the nature of the situations where golfers emphasised the use of imagery and self-talk during competition. It was the intention that information obtained from part A of this study could be used to inform the development of a questionnaire examining the relationship between context, functions and the content of imagery and self-talk. Research into this association was deemed to be of importance as findings from the formative thesis studies and extant literature suggest that athletes' use of imagery (Fournier *et al*., 2008) and self-talk (Hardy *et al*., 2005a) is determined by situational demands. Findings from study two indicated that golfers did not make use of imagery and self-talk continuously throughout competition. This study took these findings one step further identifying that when golfers were presented with more difficult or stressful situations they would more actively employ the usage of imagery and self-talk. In contrast, when playing well there was some indication that golfers would experience a degree of automaticity in both their performance and employment of imagery and self-talk.

Previous research has associated automaticity with heightened levels of performance in golf (Hellström, 2009). There is limited understanding of the psychological processes that occur during this state (Lawton, Hung, Saarela, & Hatfield, 1998), and research has revealed that golfers find it difficult to recall what strategies they employ when they are playing well (Cotterill *et al*., 2010). However, there are suggestions amongst athletes that they make less use of cognitive strategies prior to the performance of closed skills when they are playing well as they have no need for their usage (Jackson & Baker, 2001). Consequently, golfers may make less use of imagery and self-talk when performing well because they are in the desired autonomous state and, as such, do not require their usage.

Whilst it was difficult to categorise the wide range of situations where golfers used imagery and self-talk, findings revealed that they emphasised the use of the strategies more in relation to the successful execution of specific golf strokes that were perceived as being stressful. There was considerable variation between the golfers in the shots that they perceived as being stressful. Two of the golfers perceived every tee shot as stressful whilst others perceived the first tee shot, difficult shots, putting, pitch shots and long shots as stressful. Tee shots were generally referred to as being very important in themselves, with golfers arguing that the added importance and pressure associated with them led to the increased use of the strategies. Self perceived difficult shots were also identified as being stressful and, as such, were deemed to require the greater use of imagery and self-talk.

Although the perceived level of difficulty of golf strokes in themselves led to the need for the increased use of imagery and self-talk, the presentation of general competitive situations also led to the increased usage of the strategies around the performance of golf strokes that were perceived to be important, of consequence or as having implications. For example, it was suggested that the use of imagery and self-talk when putting, chipping and playing difficult shots were all more important at the beginning of the round. Golfers suggested that the reason for this heightened use was the importance of achieving a good start. Furthermore, putting to save par, or win, at the end of a round was also identified as potentially more stressful and this resulted in the heightened use of imagery and self-talk. Finally, when playing badly, the golfers suggested that the performance of difficult golf strokes was more problematic. Consequently, they placed more emphasis on the use of imagery and self-talk during this situation.

The transactional theory of stress and coping (Lazarus & Folkman, 1984) can be drawn upon to support the suggestion that golfers emphasised the use of imagery and self-talk in response to golf strokes under stressful conditions. Lazarus (1999) stated that stress is often experienced when people are presented with a situation that they perceive to be relevant to the goals that they have set themselves, or to the beliefs and values that they have about themselves. More specifically, during this appraisal, people determine whether the situation is challenging (one is excited about the difficult challenge), threatening (there is potential for some type of damage to occur) or whether they are at risk of harm or loss (damage has already occurred) (Lazarus, 1999). This definition of stress fits with the nature of the situations where golfers placed greater importance on the use of imagery and self-talk. Previous research has revealed that making an error (Nicholls *et al.*, 2005a), the first tee shot, the presentation of difficult shots, not playing well, starting a round poorly (Cohn, 1990), course challenges and unfavoured shots (Giacobbi *et al.*, 2004) are all stressors identified by competitive golfers. These sources of stress matched many of the contexts where the golfers in the present study reported the greatest use of imagery and self-talk. Moreover, the properties of the situations identified as stressful were concordant with those identified by Lazarus and Folkman (1984) and Thatcher and Day (2008). For example, the golfers reported the greater use of imagery and self-talk in situations that were ambiguous, unpredictable and outcome uncertain.

By definition the golf strokes, where golfers reported employing the use of imagery and self-talk were acute stressors. Acute stress, sometimes referred to as sudden stress, refers to stressors that are short term and demanding (Anshel, 1997). Examples of acute stressors include making an error, playing a difficult shot, negative feedback from other team members or a coach or an opponent playing well (Nicholls & Polman, 2007). Although acute stress is short in its duration, it can have immediate and debilitating effects on performance (Anshel, 1990), induce ‘choking’ (Hill, Hanton, Matthews, & Fleming, 2010) and lead to degradations in attention, effort and arousal (Lazarus & Folkman, 1984).

In accordance with the findings from part A of this study, extant research has found that athletes use cognitive strategies more widely (Jackson & Baker, 2001) and have longer pre-shot routines (Jackson, 2003) when they are presented with difficult tasks or stressful competitive situations. This has led to suggestions that athletes’ longer preparation time prior to the execution of some skills over others may be indicative of their use of coping strategies (Jackson & Baker, 2001). This suggestion is of particular relevance to the current study as the golfers repeatedly reported placing greater emphasis on the use of imagery and self-talk when under stress, which indicated that they were being used as coping strategies. The transactional theory of stress and coping (Lazarus & Folkman, 1984) supports this conclusion as it suggests that a stress appraisal often leads to a secondary appraisal whereby one asks themselves how they can cope with the situation. This secondary appraisal however, is not necessary if a situation has not been perceived as being stressful. Consequently, the use of imagery and self-talk in response to stressful situations appeared to indicate that they were being used as the means through which to cope. To exemplify the golfers use of imagery and self-talk as a means to cope they frequently reported employing the strategies when a harm or loss had occurred (e.g., playing badly), and when they were presented with challenging, threatening or difficult situations (e.g., difficult shots).

Previous research supports the use of imagery and self-talk as coping strategies, as it has been found that athletes do employ the use of the strategies in response to stressful ‘do or die’ situations (Weinberg *et al.*, 2003; Hall *et al.*, 1990; Hardy *et al.*, 2004; Hardy *et al.*, 2005a). Furthermore, examination of the methods which golfers have reported using to cope with stress in the extant literature, have commonly included imagery and self-talk (Giacobbi *et al.*, 2004; Nicholls *et al.*, 2005a). The idea that golfers employed imagery and self-talk most frequently in response to golf strokes under stressful conditions is in accordance with many of the principles of coping. Lazarus (1999) argued that people only use coping strategies when they perceive a situation to be stressful. Moreover, it is also widely accepted that coping is a conscious process which may explain why the golfers were able to recall what strategies they used when presented with stressful situations (Anshel, 2001).

A further point of importance pertained to the timing of imagery and self-talk use in response to golf strokes under stressful conditions. It was clear that golfers' usage of the strategies revolved around the execution of golf strokes. Even when golfers reported the use of self-talk between shots, it was often employed with the purpose of preparing the golfers for the next golf stroke that they had to play. This usage was then incorporated into the immediate pre-shot preparation for the golf stroke under stressful conditions indicating a two phase employment of the strategies. This is of particular importance as previous research into golf has tended to focus only on the immediate pre-shot routine preparation period (Beauchamp *et al.*, 1996; Boutcher & Crews, 1987; Crews & Boutcher, 1986; Hellstrӧm, 2009), whereas the findings from this study suggest that this pre-shot preparation, when using imagery and self-talk to cope with golf strokes under stressful conditions, may also occur during the walk between shots.

Findings from this focus group provided insight into the nature of the situations, and time points when, golfers employed imagery and self-talk. However, one limitation associated with the adoption of a focus group needs to be acknowledged before drawing conclusions. The use of focus groups is an effective method for collating information for the development of questionnaires. However, during the interview, it was difficult to 'hear' all of the golfers' voices and at times the discussion was dominated by three members. This may have meant that these three golfers' opinions and thoughts dominated the conclusions formulated. Despite these concerns, efforts were made to include all of the golfers in the discussion.

In conclusion, findings from part A of this study indicated that golfers actively employed imagery and self-talk more widely when they were presented with golf strokes under stressful conditions. These stressful conditions were found to either emanate from the nature of the golf stroke itself, or from the situation under which the golf stroke was being executed. These findings suggested that golfers frequently make use of imagery and self-talk as means for coping with the golf strokes under stressful conditions. Furthermore, although golfers' use of imagery and self-talk was centred on the execution of golf strokes, under stressful conditions, the strategies were employed both during the walk towards and immediately prior to the execution of golf strokes.

In accordance with the aims of the thesis, findings provided further information on the nature of the situations that influenced golfers' usage of imagery and self-talk. Furthermore, they also identified when golfers specifically employed the use of the strategies within these time frames. Specifically, findings from this study presented the function of stress as a determinant in the potential use of imagery and self-talk as coping strategies. Further research, however, was warranted to examine how golfers specifically use imagery and self-talk as problem and emotion focussed coping strategies when executing golf strokes under stressful conditions identified in the present study. This avenue of research would allow for the relationship between contextual demands, functional requirements and preferences for imagery and self-talk content to be better understood.

Study 3: Part B

Golfers' use of imagery and self-talk as coping strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions.

5.5 Introduction

In line with the aims of this thesis, findings from studies one, two, and part A of this study, revealed that golfers' usage of imagery and self-talk was predominantly influenced by contextual factors. More specifically, findings from study two appeared to suggest that contextual factors were the predominant determinant of functional requirements and in turn preferences for, and content of, imagery and self-talk. Consequently, it was suggested that this relationship needed to be examined in greater depth. In order to do this the nature of the specific situations where golfers used imagery and self-talk needed to be determined. Part A of this study sought to address this. Findings revealed that golfers emphasised the use of imagery and self-talk most when playing golf strokes under stressful competitive conditions. These findings led to suggestions that golfers were predominantly using imagery and self-talk as coping strategies in response to stressful situations. As such, it was suggested that further research was warranted to determine *how* golfers used imagery and self-talk to cope with golf strokes under stressful conditions. It was envisaged that addressing this research question would shed more light on the relationship between contextual factors, functional requirements and preferences for imagery and self-talk. Moreover, it was hoped that results could be used to inform the development of an imagery and self-talk intervention in consideration of these factors.

Coping is most widely recognised as 'constantly changing cognitive and behavioural efforts to manage external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (Lazarus & Folkman, 1984, p. 141). Athletes have been found to employ a wide array of different coping strategies in response to stressful situations (Gould, Finch, & Jackson, 1993a; Nicholls & Polman, 2007; Nicholls & Polman, 2008; Nicholls *et al*., 2005b). This is demonstrated most clearly by findings from a recent study which revealed that golfers employed up to 313 coping strategies (Nicholls & Polman, 2008). Examples of these strategies ranged from drinking water and remembering previous good shots and scores to planning shots and reiterating swing thoughts. As a result of the wide range of coping strategies that athletes have been found to employ, researchers have sought to 'umbrella' them through the use of the coping categories (Crocker, Kowalski, & Graham, 1998). Examples of different coping categories include approach and avoidance coping (Roth & Cohen, 1986). Approach coping typically involves taking direct action to confront and reduce stressors. In contrast avoidance coping represents a disengagement from stressors (Roth & Cohen, 1986). A further coping classification is re-appraisal coping which involves changing perceptions about the stressors experienced (Cox & Ferguson, 1991).

Although a number of different coping categories have been presented in the past (Cox & Ferguson, 1991; Endler & Parker, 1990; Roth & Cohen, 1986) one of the most popular amongst researchers is the ‘problem and emotion focussed’ coping categorisation (Crocker *et al*., 1998; Lazarus & Folkman, 1984; Nicholls & Polman, 2007). Coping strategies are classified as being problem focussed when they directly attempt to overcome the stressors that are presented in the environment (Tenenbaum *et al*., 2008). Examples of this form of coping include planning, rehearsing moves and seeking more information. Emotion focussed coping strategies are those that aim to affect the emotions that are experienced as a result of the presentation of stressors (Lazarus & Folkman, 1984).

Coping is a dynamic process and it is widely accepted that the use of problem and emotion focussed coping strategies is situation dependent. More specifically, the perceived level of control over a stressful situation is deemed to be a fundamental determinant of the use of problem and emotion focussed coping strategies (Lazarus & Folkman, 1980; Folkman & Lazarus, 1985). It is suggested that these strategies are more widely employed when people perceive themselves to be able to exert some level of control over the stressful situation. However, the use of emotion focussed coping strategies is more widely associated with situations where there is little perception of control. It is suggested that perceptions of control can change over the course of a single situation and this can impact upon the use of different coping strategies (Folkman & Lazarus, 1985). Support for this assertion has been found in both educational (Folkman & Lazarus, 1985) and sporting contexts (Gaudreau, Lapierre, & Blondin, 2001). Specifically pertaining to a sporting context, Gaudreau *et al.* (2001) examined how thirty-three adolescent golfers’ use of different coping strategies changed 2 hours before, immediately after and 24 hours after a competition. Competition was selected as it was deemed to be sufficient in invoking stress appraisals, although these were not directly assessed. Despite this, results revealed that golfers employed more problem focussed coping strategies before competition compared to the other phases of competition. It was argued that this was because the athletes had greater perceptions of control over the situation at this point. After competition, the use of problem focussed strategies reduced, presumably because nothing could be done about the result at this stage. Although research suggests that the way that people cope is dynamic and situation dependent, there is evidence to suggest that preferences can be developed for coping with similar events in similar ways (Compas, Forsythe, & Wagner, 1988; Crocker & Isaak, 1997).

Findings from study two and part A of this study indicated that golfers widely employ imagery and self-talk during competition as coping strategies. Both strategies have been identified as excellent self regulatory skills (Hardy *et al.*, 1996), and previous research has revealed that they are frequently employed as coping methods (Giacobbi *et al.*, 2004; Gould *et al.*, 1993a; Nicholls *et al.*, 2005a). Recent proposals for the use of imagery and self-talk as coping strategies have suggested that their use should be emotion focussed (Jones, 2003; Tenebaum *et al*., 2008). More specifically, motivational general mastery, arousal and specific/drive forms of imagery, and motivational forms of self-talk have all been recommended as methods to exert control over the emotions associated with stress (Jones, 2003; Tenebaum *et al.*, 2008). Whilst findings from study two appeared to support golfers' use of imagery and self-talk as emotion focussed coping strategies, golfers were also found to employ cognitive specific and general forms of imagery and self-talk as problem focussed coping strategies. To exemplify the use of the strategies in this way, results revealed that golfers placed importance on the use of imagery, supplemented with the use of self-talk, immediately prior to the execution of golf strokes under stressful conditions, as a means for planning and rehearsing how they were going to play the shot. This presented initial evidence that golfers were actively seeking to exert control over the stressful situation that they were experiencing.

In addition to findings from study two indicating that golfers made use of imagery and self-talk as both problem and emotion focussed coping strategies, there was also evidence to suggest that they had preferences for the way in which they represented these coping strategies in different situations. For example, the use of self-talk as an emotion focussed coping strategy was emphasised over imagery during the walk towards golf strokes under stressful conditions. Moreover, as has already been alluded to in the previous paragraph, imagery, supplemented with the use of self-talk, was used during the shot planning period as a problem focussed coping method. These findings raised two important questions that warranted further attention.

The first question pertained to whether or not golfers had preferences for the representation of problem and emotion focussed coping strategies in visual and verbal formats respectively. There is evidence to suggest that athletes prefer to utilise less instructional self-talk during competition as it can lead to the over conscious analysis of skills (Hardy *et al.*, 2005a). Consequently, this might mean that golfers prefer to represent instructional activity in an imaginal form, with the use of less self-talk, to avoid these potential issue arising.

Additionally, there are further suggestions that negative emotions are often presented in verbal forms (Borkovec, Ray, & Stober, 1998). As such, it has been argued that verbal strategies should be used to directly tackle the representation of negative thoughts in this way (Fletcher & Hanton, 2001; Goleman, 1995).

The second question that emerged from findings from both study two and part A of this study, pertained to how golfers' use of imagery and self-talk as coping strategies changed during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions. It is widely accepted that athletes' use of coping strategies can change over the course of a situation and that these changes are largely dependent on perceptions of control over the situation (Gaudreau *et al.*, 2002). Findings from study two indicated that golfers used self-talk between shots to control their emotions and only employed imagery, supplemented with the use of self-talk, to plan shots in the vicinity of the golf ball. The golfers in study two explained that they could not consider planning a golf stroke until they could see all of the situational variables. This suggestion was supported by findings by Cotterill *et al*. (2010) who also found, upon interviewing highly skilled golfers, that they did not start to plan shots until they could 'see' all of the conditions. Findings from study two, therefore, presented initial evidence that the perceived level of control over golf strokes under stressful conditions was a mediating factor in the use of imagery and self-talk as problem and emotion focussed coping strategies. This was a novel finding and warranted further attention as, to date, there is limited understanding as to how golfers' use of coping strategies changes within competitions (Hellström, 2009).

In order to address the aims of this thesis, and the research questions that emerged from study two and part A of this study, the purpose of part B of this study was to determine how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions. More specifically, based on findings from study two, this study sought to determine the influence of context and coping function on the preferences for imagery and self-talk as coping strategies prior to the execution of golf strokes under stressful conditions.

Skill level differences in use were also examined, as previous research has revealed that highly skilled athletes use imagery (Hall *et al.*, 1990) and self-talk (Hardy *et al.*, 2004) to a greater extent than less skilled athletes. Moreover, research by Yoo (2001) found skill level to be a determinant of coping, with more skilled athletes employing the use of problem focussed coping strategies more than less skilled athletes. Yoo (2001) argued that the skilled athletes' heightened use of problem focussed coping strategies might have been a function of their higher perceived levels of self efficacy. These skill level differences in usage were ascertained to provide an initial indication of the most effective usage of the strategies.

5.6 Method

5.6.1 Design

In order to address the research question, a 3 x 2 x 2 x 2 design, varying handicap (skilled (≤5), semi-skilled (6-12) and less skilled (≥13) golfers), psychological skill (imagery and self-talk)), context (walking towards, or, immediately prior to the execution of golf strokes under stressful conditions) and coping strategy (problem and emotion focussed coping) with repeated measures on the latter three factors, was employed. A questionnaire, which allowed for the assessments of the repeated measures, was designed to address the research question. The dependent variable was amount of usage.

5.6.2 Participants

Once ethical clearance had been gained from the school ethics committee, competitive male golfers were recruited for the study. In accordance with the handicapping system (HandicapMaster, 2010), category one/skilled (Handicap ≤5), two/semi-skilled (Handicap = 6-12) and three/low skill (Handicap ≥ 13) golfers were recruited. Questionnaires from 145 golfers were sufficiently completed to be used for the study. Questionnaires that were internally inconsistent, demonstrating misunderstanding, and questionnaires with large numbers of items missing were not included in the study. Internal inconsistency was determined when golfers demonstrated a miss-match in responses from primary items and follow up responses on the purpose designed questionnaire. For example, if golfers indicated that they never used a particular imagery and self-talk coping strategy but then provided a follow-up response to indicate what they specifically imagined or said to themselves their data was withdrawn on the grounds of miss-understanding.

The participant characteristics of the golfers, whose data were used in the current study, were as follows: mean age = 46.38 ± 14.73), mean handicap = 11.84 ± 6.04), mean number of years played = 17.82 ± 10.44), mean number of competitions played over the course of the last year = 30.26 ± 18.43). A limit on the age of the golfers recruited for the current study was not adopted, as golf is a sport played by a varying range of ages (Gregg & Hall, 2006). Table 6.1 demonstrates the mean age and number of golfers per skill level group.

Table 5.1: Sample characteristics for each skill level group

Skill level	Mean age (SD)
Skilled (n = 28)	33.50 (12.29)
Semi-skilled (n = 50)	44.14 (12.95)
Low skill (n = 67)	53.43 (12.73)

5.6.3 Measurement instrument

A questionnaire was designed for the purpose of the study. The aim of this questionnaire was to identify how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions. The development of the questionnaire went through four phases of formation until a questionnaire that was both reliable and ‘user friendly’ was created (see appendix 14).

The first phase of questionnaire development has already been discussed in part A of this study. To recap part A of this study employed the use of a focus group to identify the common characteristics of the competitive situations where golfers used imagery and self-talk. Findings revealed that the situations in which golfers employed imagery and self-talk were predominantly stressful. For example, golfers were found to use the strategies more widely when playing hazardous water shots or shots that they consistently had difficulty with. In addition, findings revealed that golfers used the strategies during both the walk towards, and immediately prior to the execution of, golf strokes under these stressful conditions. As a result of these findings the decision was taken to ascertain *how* golfers used imagery and self-talk during both the walk towards, and immediate preparation to execute, golf strokes under stressful conditions. The golf strokes identified as stressful in the focus group were used in the questionnaire to set the context for the questions thus 'triggering' golfers' thoughts of what was meant by the term stressful golf stroke.

The first version of the questionnaire was 40 items long and consisted of four sections assessing golfers' use of the five different types of imagery (Hall *et al*., 1998) and self talk (Hardy *et al*., 2001a), on a five point Likert scale (0 = never, 4 = always) in, a) a stressful situation immediately prior to the execution of a golf stroke, b) a stressful situation when walking between golf strokes, c) a non-stressful situation immediately prior to the execution of a golf stroke and d) a non-stressful situation when walking between shots. For each section golfers were asked to think of one particular stressful shot and were asked about their use of imagery and self-talk prior to the execution of this shot. Examples of stressful shots were provided using the data acquired from the focus group.

Two of the imagery and self-talk items (CS & CG) in the questionnaire were representative of problem focussed coping whilst three of the items (MS, MG-M & MG-A) were representative of emotion focussed coping. The method of getting participants to rate what they would do and think in response to a stressor has been used previously by Gaudreau *et al*. (2001), as has the method of getting participants to state how they would typically cope (Crocker & Bouffard, 1990). This questionnaire was pilot tested with 14 golfers. Participant feedback about the questionnaire revealed that golfers found it difficult to answer as they had to consider how they would feel and cope in a range of different scenarios. Additionally, some of the golfers reported finding it hard to differentiate between the different scenarios as it was too long and confusing. As a result of this feedback the questionnaire was redeveloped.

In order to reduce the complexity of the questionnaire phase three of its development involved removing the questions pertaining to non-stressful situations as findings from study 2, and the previous focus group, revealed that golfers emphasised the use of imagery and self-talk far less in these situations than they did in stressful situations. As such golfers' use of imagery and self-talk was only examined during the walk between, and as they were just about to execute golf strokes under stressful conditions. All questions required golfers to consider how they would use imagery and self-talk before the execution of a stressful golf stroke. Examples of golf strokes in these two different stressful situations were provided using information gained from the focus group.

A key feature of this revised questionnaire was that the number of items assessing golfers' use of problem and emotion focussed imagery and self-talk was reduced to one item each. For example, golfers' use of problem focussed imagery and self-talk was ascertained by asking them how much they imagined or talked themselves through their plan of how to play the stressful golf stroke. Emotion focussed imagery and self-talk was assessed by asking golfers to rate how frequently they imagined or talked themselves into their optimum emotional state. This meant that the number of questions that the golfers were answering reduced from 40 to 8. Responses were again made on a five point Likert scale (0 = never, 4 = always). To aid simplicity, similar to the method employed by Short *et al*., (2004), after each main question golfers were asked to select one phrase that exemplified what they specifically imagined or said to themselves. For example, after responding to the problem focussed coping questions participants were asked to state whether they talked themselves through/imagined the execution of the golf swing or their strategy for playing the golf stroke. These items were representative of CS and CG imagery and self-talk types respectively. After the emotion focussed coping items golfers were asked to state whether they imagined/talked to themselves to a) optimise their anxiety/arousal, b) enhance confidence or c) motivation. These items were representative of MG-A, MG-M and MS imagery and self-talk types respectively.

This newly designed questionnaire was pilot tested with 12 golfers and they were asked to provide feedback on it. Participant feedback was mixed with some of the golfers revealing that they found the items relevant and easy to understand and others stating that some of the questionnaire items were problematic. In particular one participant argued that the terminology 'optimum emotional state' and 'optimising arousal' were too academic and thus confusing. In addition, it was suggested that the instructions for completing the questionnaire should request that golfers think of just one golf stroke that they find stressful across both scenarios, thus allowing them to better consider their use of imagery and self-talk during both the approach, and immediate preparation, for the execution of the shot. This was deemed preferable as it truly examined golfers' progressive use of the strategies. With these considerations in mind the final version of the questionnaire was created.

The final questionnaire consisted of 8 questions that instructed golfers to rate the extent to which they used problem and emotion focussed imagery and self-talk on a 5 point likert scale (0 = never, 4 = always). The questionnaire started by instructing golfers to think of a 'stressful' golf stroke that they might encounter during competition. The golfers were provided with examples of potentially stressful golf strokes to ensure their understanding. The examples provided were based on the findings from the focus group used in study three and included the first tee shot in front of a crowd of people, a stroke that they consistently had trouble with such as chips shots or short putts), a difficult shot that they had to play after making a mistake on the previous hole and a difficult shot where they needed to clear a deep greenside bunker or water hazard. The golfers were also instructed that they could consider other stressful strokes that were more relevant to them.

Golfers were then instructed that the following eight items on the questionnaire were going to ask them about their use of imagery and self-talk, during the walk towards and immediate preparation to execute the stressful golf stroke in competitions. The questionnaire was progressive firstly asking golfers about their use of the strategies during the walk towards the shot, and then as they were just about to execute the shot. Questions pertaining to the use of the imagery and self-talk as problem focussed coping strategies, asked golfers to rate the extent to which they talked themselves through, or, created an image of playing the stressful golf stroke. Based on the feedback from the previous pilot studies, questions pertaining to the use of the strategies as emotion focussed coping strategies asked golfers to what extent they talked to themselves to control, or to imagine controlling their emotions for playing the golf stroke under stressful conditions.

In accordance with the methodology used by Short *et al.* (2004) after each question golfers were asked to select one phrase that specifically demonstrated what they imagined or said to themselves when using problem or emotion focussed imagery and self-talk types. This method for gaining more specific information about golfers' use of imagery and self-talk was very successful in the previous pilot study, although some of the terminology used was modified based on the feedback received. For example, after the problem focussed questions instead of asking golfers whether they imagined or talked themselves through their strategy for executing the golf stroke, they were asked whether they considered their plan of where they wanted the ball to go. Additionally, golfers were asked whether they imagined/talked themselves into being in control of their nerves and worrying thoughts rather than whether they were optimally aroused for the execution of the golf stroke.

The questionnaire not only served in developing understanding as to how golfers' preferences for, and use of, imagery and self-talk changed over time but also examined their use of the strategies in response to one stressor. This decision was taken as very few studies have examined peoples use of coping strategies in relation to single stressors (Somerfield & McCrae, 2000). Initial support for the questionnaire's psychometric properties were determined by examining its test re-test properties. All recruited participants were invited, although could refuse, to complete the questionnaire twice. Thirty participants sufficiently completed the questionnaire twice. Satisfactory reproducibility was demonstrated with an intraclass correlation coefficient (ICC) value of 0.85 for the whole questionnaire. Further examination of the ICCs for the individual items ranged between 0.58 – 0.87.

5.6.4 Procedure

Competitive golf players were recruited at local golf clubs in the North East of England on weekend competition days. If participants agreed to be involved in the research project they were issued with a questionnaire pack containing a participant information sheet (Appendix 15), informed consent document, a demographic information form (recording their handicap, age and number of competitions they had participated in) and the purpose designed questionnaire. Participants completed the questionnaire packs at the golf club and returned them to the researcher on the same day. Questionnaires were only completed before competitions to control for the potential effects that competition events may have had on the golfers' responses. Upon completion of the questionnaires participants were given a participant debrief document (Appendix 16). Completion of the questionnaire took 5 – 10 minutes.

5.6.5 Data analysis

Prior to the main analysis data were analysed using PASW statistics version 18. In order to determine if age and playing experience should be considered as covariates, two one way between groups ANOVAs were undertaken on these variables to ascertain the differences between the skill level groups. Additionally, eight multiple linear regressions were conducted to determine whether age was predictive of the use of imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions.

The main analysis adopted the use of a 3 (skill level) x 2 (context) x 2 (psychological skill) x 2 (coping method) repeated measures ANOVA, to examine the impact of skill level and context on the use of imagery and self-talk as coping strategies during competition. Chi square analyses were also undertaken to determine the association between skill level and the exact content of imagery and self-talk when used as problem and emotion focussed coping strategies during the walk towards, and immediately prior to the execution of, golf strokes under stressful conditions. Content was determined by examining participants' follow up responses to each of the eight items on the questionnaire where they specifically indicated what they imagined/said to themselves.

Significance for comparisons and associations was set at $a = 0.05$. Observed power for selected comparisons was calculated along with effect sizes. Pearson correlations r (Field, 2005) were used to calculate effect sizes for main effects whilst cohen's d (1992) was used for specific comparisons.

5.7 Results

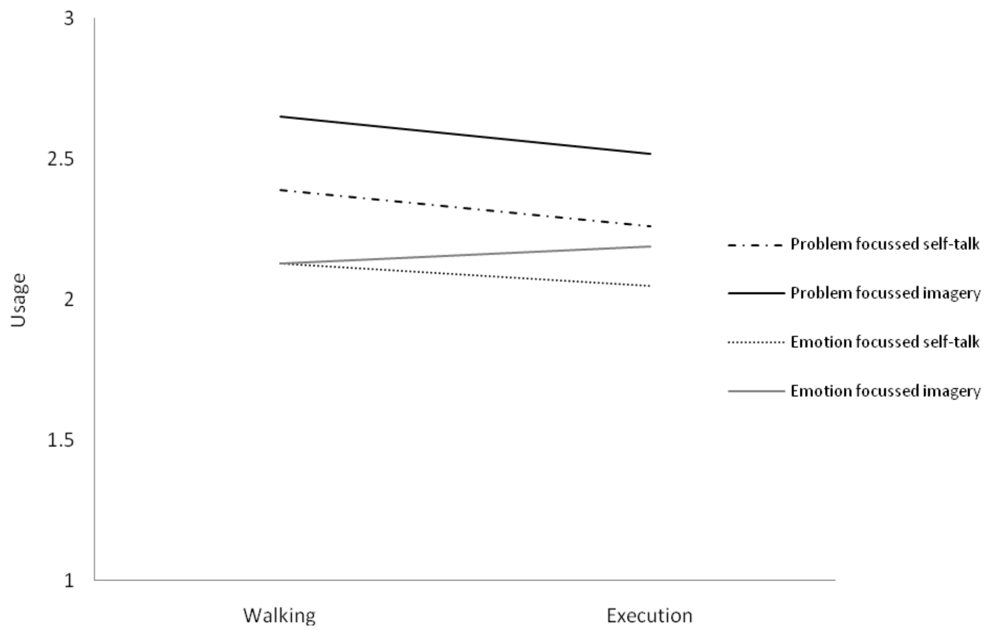
5.7.1 Skill level differences in age and playing experience

Before undertaking the main analysis it was necessary to consider whether age and playing experience should be considered as covariate influences. Playing experience was considered as Hanton, Neil, Mellalieu, and Fletcher (2008) previously suggested that it may be predictive of how athletes cope. More specifically, they argued that the novelty of situations that less experienced athletes are presented with may reduce their perceptions of control, which could in turn influence their employment of coping strategies. Results from a one way between groups ANOVA revealed that there were significant differences between the three skill level groups in age ($F(2, 142) = 25.393$, $P<0.0005$, $r = 0.51$, power = 1.0). Pairwise comparisons indicated that skilled golfers were significantly younger than semi-skilled golfers ($P<0.002$, $r = 0.83$) and less skilled golfers ($P<0.0005$, $r = 1.56$). Furthermore, the semi-skilled golfers were found to be younger than the less skilled golfers ($P<0.0005$, $r = 0.02$). Results from a one way ANOVA examining the differences between the groups in playing experience however, found no significant differences ($F(2, 144) = 0.171$, $P=0.843$, $r = 0.28$, power = 0.076). This indicated that playing experience need not be entered into the regression model or considered as a covariate in the main analyses. However, due to the between group differences in age, eight linear regressions were undertaken to determine if age was a significant predictor of imagery or self-talk use as problem and emotion focussed coping strategies, during either the walk towards or, immediate preparation to execute, golf strokes under stressful conditions. These analyses did not find age to be predictive of usage (Appendix 17). Therefore age was not considered as a covariate in the main analysis.

5.7.2 The impact of skill level and context on the usage of imagery and self-talk as coping strategies

Figure 5.3 illustrates golfers' use of different imagery and self-talk methods during the walk towards, and as they were just about to execute, golf strokes under stressful conditions.

Figure 5.3: Imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediately prior to the execution of, golf strokes under stressful conditions



Results from the 3 (skill category) x 2 (psychological skill) x 2 (context) x 2 (coping strategy) ANOVA, revealed no main effects in psychological skills usage between the skilled, semi skilled and less skilled golfers (F(2,138) = 0.658, P = 0.519, *r* = 0.09, power =

0.16). This suggested that skill level was not an influential factor in golfers' use of imagery and self-talk. An interaction effect was however found for skill level by context ($F(2, 138) = 3.774$, $P = 0.025$, $r = 0.23$, power = 0.68). Bonferonni and LSD corrected pairwise comparisons failed to indicate where the differences lay ($P = 0.055$). However, adjusted means did indicate that category two golfers were using more psychological strategies during the walking period (Mean = 2.35, (SE, 0.10)) than the immediate pre-shot routine time period (Mean = 2.08, (SE, 0.12)).

Results revealed a main within effect for psychological strategy ($F(1, 138) = 11.320$, $P = 0.001$, $r = 0.28$, power = 0.92), with golfers reporting greater use of imagery than self-talk. A main effect was also found for coping method ($F(1, 138) = 31.079$, $P<0.005$, $r = 0.43$, power = 1.0), with golfers being found to employ problem focussed coping methods more than emotion focussed coping methods. Additionally, an interaction effect was found between psychological skill and coping method ($F(1, 138) = 6.793$, $P = 0.010$, $r = 0.22$, power = 0.74). More specifically Bonferroni adjusted pairwise comparisons revealed that imagery was found to be used significantly more as a problem focussed coping strategy than self-talk ($P<0.0005$). However, there was no difference in how imagery and self-talk were employed as emotion focussed coping strategies ($P = 0.178$). No other effects were found (Appendix 18).

5.7.3 Imagery and self-talk as problem focussed coping strategies

In order to gain further specific detail about how golfers used imagery and self-talk as problem focussed coping strategies golfers were asked to state whether they focussed on the technical or strategic elements of the skill when using the strategies in this way. Table 5.2 illustrates how the golfers used imagery and self-talk as problem focussed strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions.

Table 5.2: Problem focussed imagery and self-talk (%)

Problem focussed strategies	Technical	Strategic
Walking towards the stressful stroke problem focussed self-talk		
Skilled	20.8	79.2
Semi Skilled	20.0	80.0
Low skill	33.9	64.3
Total	26.7	72.5
Walking towards the stressful stroke problem focussed imagery		
Skilled	16.0	80.0
Semi Skilled	23.3	74.4
Low skill	29.3	69.0
Total	24.6	73.0
Just about to execute stressful stroke problem focussed self-talk		
Skilled	29.2	70.8
Semi Skilled	30.0	70.0
Low skill	42.4	57.6
Total	35.8	64.2
Just about to execute the stressful stroke problem focussed imagery		
Skilled	38.5	61.5
Semi Skilled	31.1	66.7
Low skill	37.9	62.1
Total	35.7	63.6

Table 5.2 demonstrates that, for all coping methods in both contexts an emphasis was placed on using the strategies to plan where to play the golf strokes, rather than rehearse technique. Four separate chi squared analyses, on each of the items, revealed no significant associations between skill level and the use of technical and strategic imagery and self-talk (Appendix 19).

5.7.4 Imagery and self-talk as emotion focussed coping strategies

When using emotion focussed imagery and self-talk golfers were asked to specify whether they were using the strategies to affect confidence, nerves and worrying thoughts or motivation. Table 5.3 displays the content of golfers' emotion focussed imagery and self-talk.

Table 5.3: Emotion focussed imagery and self-talk (%)

Emotion focussed strategies	Confidence	Anxiety control	Motivation
Walking towards the stressful stroke emotion focussed self-talk			
Skilled	68.0	16.0	16.0
Semi Skilled	55.0	15.0	30.0
Low skill	45.5	25.5	29.1
Total	53.3	20.0	26.7
Walking towards the stressful stroke emotion focussed imagery			
Skilled	68.0	16.0	16.0
Semi Skilled	58.5	12.2	29.3
Low skill	35.1	38.6	26.3
Total	49.6	25.2	25.2
Just about to execute the stressful stroke emotion focussed self-talk			
Skilled	70.8	12.5	16.7
Semi Skilled	61.0	19.5	19.5
Low skill	52.7	21.8	25.5
Total	59.2	19.2	21.7
Just about to execute the stressful stroke emotion focussed imagery			
Skilled	46.2	19.2	34.6
Semi Skilled	40.0	22.5	37.5
Low skill	37.7	26.4	35.8
Total	40.3	23.5	36.1

Inspection of Table 5.3 shows that emotion focussed imagery and self-talk in the most part, focussed on affecting confidence. Four separate chi squared analyses, on each of the items, were undertaken to determine the association between skill level and the use of imagery and self-talk as emotion focussed coping strategies. The only significant association found was between skill level and the use of imagery as an emotion focussed coping strategy during the walk towards the stressful golf stroke ($\chi^2 = 13.574$, df = 4, P = 0.009). Less skilled golfers were found to focus on the imagination of controlled nerves and motivation more than the other groups, who imagined being more confident (Appendix 20).

5.8 Discussion

The overall aim of this thesis was to determine the factors influencing golfers' usage of imagery and self-talk as a prequel to developing an intervention for managing the successful execution of golf strokes under stressful conditions. Findings from study two and part A revealed that golfers more actively employ the usage of imagery and self-talk as coping strategies when playing golf strokes under stressful conditions. Moreover, findings from study two presented initial evidence to suggest golfers' usage of imagery and self-talk as coping methods might be determined by contextual factors and coping function. This study sought to address this initial evidence and determine how golfers used imagery and self-talk as coping strategies when they were presented with golf strokes under stressful conditions during competition. Firstly, it identified how golfers used imagery and self-talk as problem and emotion focussed coping strategies, and secondly ascertained if they displayed preferences for representing different coping strategies in different forms. Thirdly, it determined how temporal patterning affected golfers' usage of imagery and self-talk prior to the execution of golf strokes under stressful conditions. Finally, skill level differences in the usage of the strategies were also determined to provide an initial indication of strategy effectiveness.

5.8.1 Imagery and self-talk as problem focussed coping strategies

Motivational forms of imagery and self-talk have typically been recommended as emotion focussed coping strategies (Jones, 2003; Tenenbaum *et al.*, 2008). Moreover, research into imagery (Hall *et al.*, 1998) and self-talk (Hardy *et al.*, 2001a; Hatzigeorgiadis *et al.*, 2007), respectively, has indicated that the content of the strategies when used to inoculate against stress should directly focus on the negative emotions experienced.

In contrast to what has been recommended in the extant imagery and self-talk literature, findings from the current study revealed that golfers reported greater use of imagery and self-talk as problem focussed coping methods, rather than as emotion focussed coping methods. Although these findings contrasted with previous recommendations for imagery and self-talk use they are in accordance with existing research into coping in golf. Extant research has found that golfers typically employ problem focussed coping strategies more than emotion focussed coping strategies (Gaudreau *et al.*, 2002 Nicholls *et al.*, 2005a). It has been suggested that active attempts to change the nature of a stressful situation result in more positive affect and emotional outcomes, than the use of emotion focussed coping strategies (Crocker & Graham, 1995; Folkman & Lazarus, 1988; Ntoumanis & Biddle, 1998). Consequently, it may be possible that golfers' use of problem focussed imagery and self-talk was multifunctional and not only presented them with the opportunity to change the stressful situation, but also served in controlling their emotions. From an imagery (Short *et al.*, 2004) and self-talk (Hardy, 2006) perspective, there is support for the multifunctional nature of the strategies. Furthermore, findings from study two lend credence to this argument with the golfers indicating that their use of the strategies as problem focussed methods, also served in controlling their emotions. The dual functions of problem focussed coping methods may explain why golfers demonstrated a preference for the use of the strategies in this way.

Specific examination of the content of golfers' use of imagery and self-talk as problem focussed coping strategies revealed that they predominantly used them to externally plan where they wanted the ball to go, rather than rehearse the technique of the golf stroke. This finding was in accordance with those from study two and existing peer reviewed research. Previous research has revealed that golfers prefer to adopt an external focus when imagining golf strokes and imagine a variety of different stroke options (Bernier & Fournier, 2010). Moreover, research has revealed that golfers actually perform better with the use of externally focussed self-talk (Hardy & Bell, 2009). It is likely that golfers prefer to adopt externally focussed versions of the strategies, as it allows for their natural control mechanisms to be used (McNevin *et al.*, 2003), whilst ensuring that shots can be planned in consideration of all extraneous variables.

5.8.2 Imagery and self-talk as emotion focussed coping strategies

Findings from the current study indicated that golfers used imagery and self-talk to a lesser extent as emotion focussed coping strategies than problem focussed coping strategies. There are a number of possible explanations for the lesser use of imagery and self-talk as emotion focussed strategies. Golfers place great importance on 'staying in the moment' and often emphasise the importance of playing one shot at a time (McCaffrey & Orlick, 1989). This 'one shot' approach to golf performance may consequently mean that golfers prefer to focus on planning their shots rather than controlling their emotions. Additionally, many of the existing recommendations for how golfers should approach golf performance are highly technical. Many manuals are available to golfers instructing them how to play golf strokes (Perkin-Ceccato, Passmore, & Lee, 2003). Moreover, golfers have indicated that the strategies that they use during competition are in part formed through information provided in these golf magazines and manuals (Cotterill *et al.*, 2010). Consequently, the emphasis placed on stroke execution in the golfing literature might mean that golfers neglect to use strategies to control their emotions.

The lesser use of imagery and self-talk as emotion focussed coping strategies may be further explained by golfers' perception of control over the golf strokes that they are presented with. Nicholls, Holt, and Polman (2005b) argued that certain stressors in competitive golf may be perceived as being more controllable than others. For example, they explained that the stress associated with weather and opponents would be perceived as less controllable than the stress associated with the golf swing or focus. All golfers in the current study were instructed to think of a golf stroke that they typically found stressful. As such, the golfers may have perceived this to be a controllable rather than an uncontrollable stressor which might explain why they made less use of imagery and self-talk as emotion focussed coping strategies and more of them as problem focussed methods. This is because it is widely acknowledged that a preference for problem focussed coping over emotion focussed coping is displayed in situations where greater control is perceived (Lazarus & Folkman, 1984). Another explanation for the lower use of imagery and self-talk, as emotion focussed coping strategies is that golfers may have had difficulty recalling their use of emotion focussed coping strategies. The experience of stress can be accompanied by a variety of emotions (anger, anxiety, excitement etc.) (Folkman & Lazarus, 1985). Research has indicated that people experience greater difficulty recalling mixed emotions compared to singular emotions (Aaker, Drolet, & Griffin, 2008). Consequently, if golfers had difficulties recalling their emotions they may have had further problems recalling what strategies they used to inoculate against them.

Additionally, golfers' lesser use of imagery and self-talk as emotion focussed coping strategies, compared to problem focussed coping strategies, might be explained by considering the way in which they appraised the stressful situation. It has been suggested that perceptions of stress are often accompanied by either an appraisal of challenge, threat, harm or loss (Lazarus & Folkman, 1984). Research suggests that the different appraisals of stressful situations impact upon the choice of coping strategy adopted (Carver & Scheier, 1994; Folkman & Lazarus, 1985; Lazarus, 1999; McCrae, 1984). For example, it has been found that problem focussed coping strategies are used more widely in response to situations where challenge or benefit are perceived, whereas emotion focussed coping strategies have been found to be used more widely in response to situations where harm and threat appraisals are experienced (Folkman & Lazarus, 1985, 1988; McCrae, 1984). A weakness of the questionnaire used for this study was that it did not allow for the differentiation to be made between the different types of stressful strokes with which golfers were presented with. It is conceivable that golfers used imagery and self-talk as problem focussed coping strategies more than emotion focussed coping strategies because they appraised the golf strokes as challenging rather than threatening.

A point of interest was that when golfers did report using imagery and self-talk to control their emotions they reported using the strategies to increase their confidence rather than directly deal with anxiety responses. There are several reasons why golfers may have demonstrated this preference. Firstly, the experience of stress can be accompanied by a variety of emotions. As such, although golfers may have been presented with a stressful situation they may not have felt anxious. This may have consequently negated the need for strategies to control anxiety responses. Secondly, it is widely considered that elevations in confidence can lead to more facilitative interpretations of anxiety (Jones & Swain, 1995). Moreover, existing research has found imagery and self-talk usage to be related to confidence and positive interpretations of anxiety (Neil *et al.*, 2006). Consequently, it is possible that golfers were tackling their anxious responses through elevations in confidence with the use of the strategies.

5.8.3 Imagery versus self-talk as coping strategies

In addition to golfers demonstrating a preference for the use of problem focussed coping, they also had a preference for adopting the use of imagery over self-talk. Moreover, golfers reported using imagery significantly more than self-talk as a problem focussed coping strategy. Despite this, no differences were found between imagery and self-talk in their use as emotion focussed coping strategies.

The greater use of imagery over self-talk as a problem focussed coping strategy is of both theoretical and practical importance. From theoretical perspective results partially support an extension of the model of imagery proposed by Fournier *et al*., (2008) to include self-talk. This is because results appeared to suggest that functional requirements not only influence golfers' use of imagery but also their preferences for the use of the strategy over self-talk. In addition, from a practical perspective findings indicate that golfers may prefer to use imagery as a problem focussed coping method than self-talk. This preference can be explained from a number of perspectives.

Firstly, the nature of golf as a sport may explain why golfers demonstrated a preference for imagery over self-talk as a problem focussed coping strategy. Golf is a visually demanding sport, and players are required to make visual assessments of their surroundings in order to allow them to execute golf strokes successfully. Consequently, although self-talk can be used to facilitate the planning of golf strokes, it does not have imagery's breadth of dimension which allows players to estimate and imagine how the ball will react in the surrounding conditions. This would suggest that having a mental plan of how the ball is going to react, is central to the planning of shots under stressful conditions.

Despite this intuitively appealing argument, problem focussed self-talk was found to be the second most widely employed coping strategy amongst golfers. As such, although golfers' predominant strategy for planning their shots is imagery, they may also use self-talk to supplement the use of the strategy. Findings from study two, and suggestions from existing peer reviewed research and the dual coding theory (Paivio, 1971), have indicated that self-talk can be used alongside imagery to add clarity (Kendall *et al.*, 1990), manipulate (Paivio, 1986) and correct it (Cumming *et al.*, 2006). With this in mind it may be possible that although golfers predominantly employ imagery to plan golf strokes under stressful conditions, they might use self-talk to manipulate their imagined shots.

5.8.4 Temporal patterning

It is widely accepted that the coping strategies that athletes employ change over the course of a situation in relation to changes in perceptions of control (Gaudreau *et al.*, 2001). Findings from study two lent some support to this notion when it was found that golfers employed self-talk between golf strokes as an emotion focussed coping strategy and imagery, supplemented with the use of self-talk, during the immediate pre-shot routine as a problem focussed coping strategy. Despite this, findings from the current study did not support context as an influential factor in golfers' use of imagery and self-talk as coping strategies. More specifically, golfers reported the use of both strategies equally, during the walk towards and immediately prior to the execution of golf strokes, under stressful conditions.

These findings provide opposition to the models of imagery (Fournier *et al*., 2008) and self-talk (Hardy *et al*., 2010) that present contextual factors as a determinant of the functions served by the strategies. However, there are several reasons for the lack of interaction found between golfers' use of imagery and self-talk during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions. Firstly, it is possible that the issues associated with recalling mixed emotions (Aaker *et al.*, 2008) may have meant that, even though golfers were using self-talk between golf strokes to control emotions, they were not aware of its use in this way. Additionally, a potential limitation associated with the questionnaire may also provide some understanding as to why no interaction effects were found. When completing the questionnaire golfers were asked only to think about their use of the strategies during the walk towards, and immediate preparation to execute a golf stroke, under stressful conditions. A further distinction, however, may have been required as Hellström (2009) argued that the psychological variables associated with peak performance may vary before, during and after a golf stroke. As such the questionnaire may not have been specific enough in terms of determining how golfers' use of imagery and self-talk changed over the course of a golf stroke under stressful conditions. Finally, it is also possible that golfers' perceptions of control did not change leading up to the execution of golf strokes, as golf strokes in themselves are perceived as controllable in their very nature (Nicholls *et al.*, 2005b).

Although results from the current study did not show an interaction between context and the use of imagery and self-talk as coping strategies, they did provide an indication that the preparation for the execution of stressful golf strokes is more extensive than just the immediate pre-shot routine period. This is of importance, as existing research into golfers' use of the strategies has tended to focus only on the immediate pre-shot routine time period (Beauchamp *et al.*, 1996; Boutcher & Crews, 1987; Cohn *et al*., 1990; Hellström, 2009). This is in spite of arguments in the literature that golfers should use the time between shots to employ the use of coping strategies (Nicholls *et al.*, 2005a). Findings appear to reiterate the importance of coping between shots in stressful situations.

It is possible that golfers employ imagery and self-talk during both the walking and immediate pre-shot routine time period to enable adequate time to plan golf strokes fully. The use of the strategies during the walking period is likely to be important as the occurrence of negative or unwanted thoughts can emerge at this point (Nicholls *et al.*, 2005a; Pates *et al.*, 2001). Given that the golfers in this study were asked to think specifically about the period of time spent walking towards stressful strokes, it seems logical that they would employ problem and emotion focussed strategies, in visual or verbal forms, to control their thoughts and direct attention.

5.8.5 Skill level differences

Although not the sole purpose of the study, the impact of skill level on golfers' use of imagery and self-talk was examined to provide an initial indication of the most effective strategies. Previous research has found skill level to be a mediator of the use of coping strategies (Yoo *et al.*, 2001). However, results from the current study did not support these previous findings, as all golfers, regardless of skill level, employed imagery as a problem focussed coping method most. The most likely explanation for the lack of skill level differences found in the use of imagery and self-talk as problem and emotion focussed coping strategies may stem from the handicapping system in golf. The handicapping system in golf might mean that all golfers, regardless of skill level, feel able to exert enough control over the stressor to employ problem focussed coping strategies. It is possible that skill level differences in the employment of coping strategies may be better found in sports that do not cater for differences in ability during competition.

5.9 Conclusion

Although there were limitations associated with the questionnaire used in this study, findings provided new information on the factors influencing golfers' use of imagery and self-talk in response to golf strokes under stressful conditions. More specifically, in contrast with existing recommendations (Jones, 2003; Tenenbaum *et al.*, 2008), results indicated that golfers adopt a highly strategic approach to coping with golf strokes under stressful conditions. Specifically, golfers employ problem focussed imagery, followed by self-talk, most, to aid the planning of stressful golf strokes. In accordance with the transactional theory of stress and coping (Lazarus & Folkman, 1984) it was concluded that golfers display a preference for the use of imagery and self-talk as problem focussed coping strategies rather than emotion focussed strategies because they either perceive the presentation of the golf strokes under stressful conditions as a) controllable, or b) challenging.

Although imagery appears to be the dominant problem focussed coping strategy, it is plausible, given the results from study two, that golfers may employ self-talk alongside it to help add clarity to, and correct, the imagined shots. These suggestions for the use of the strategies in conjunction are in accordance with those presented in the dual coding theory (Paivio, 1971).

In conclusion, findings from part B of this third study, and all studies conducted within this project have consistently indicated that golfers' usage of imagery and self-talk is shaped by contextual factors and functional requirements. Although these findings are of practical importance as coaches and players alike may now be made more aware of golfers' preferences for the use of the strategies, their effectiveness needs to be determined. Research has found positive relationships between the usage of imagery and its perceived effectiveness (Short *et al*., 2007; Weinberg *et al*., 2003), although there is less understanding of the relationship between self-talk usage and effectiveness (Hardy *et al*., 2004). Findings have consistently revealed that golfers adopt a strategic approach to planning and managing golf strokes under stressful conditions. However, no differences between golfers of differing skill levels were found in their usage of the strategies in this way. Whilst the handicapping system in golf may explain why no differences were found, further research determining the effectiveness of imagery and self-talk as problem focussed coping methods is warranted. Understanding of this effectiveness is of importance as golfers demonstrate strong preferences for the usage of the strategies in this way.

6. Study 4: The effectiveness of imagery and self-talk in facilitating the production of golf strokes under stressful conditions.

6.1 Introduction

This thesis has sought to identify the factors influencing golfers' usage of imagery and self-talk. Findings from studies one, two and three (part A and B) all indicated that contextual factors and functional requirements are the predominant determinants of the usage of imagery and self-talk, with golfers applying their use most widely as problem focussed coping strategies under stressful competitive conditions.

Whilst golfers emphasise the usage of imagery and self-talk as problem focussed coping strategies, it is necessary to determine their effectiveness. This is of particular importance for several reasons. Firstly, although golfers demonstrate strong preferences for the usage of imagery and self-talk as problem focussed coping strategies, the lack of skill level differences observed in their use in study four raised question marks over their effectiveness when used in this way. However, it must be acknowledged that these findings may have been due in part to the handicapping system used in golf rather than the strategies being ineffective. Additionally, owing to imagery and self-talk predominantly being found to be used as coping strategies specifically, it was especially important to determine their effectiveness because coping is only a person's 'efforts' to manage the internal and external demands placed on them (Lazarus & Folkman, 1984). Consequently, although a person may employ strategies in an attempt to cope, their efforts may be ineffective (Nicholls *et al.*, 2005b; Ntoumanis & Biddle, 1998). This is of particular importance, as it is suggested that the ability to cope effectively with acute sources of stress, such as stressful golf strokes, is extremely important to sports performance (Nicholls *et al.*, 2005b) and consistency (Brown *et al.*, 1993). With this consideration in mind, further research was warranted to determine the effectiveness of imagery and self-talk as problem focussed coping strategies.

Although it is important to be able to cope with acute stress there have been few stress management packages developed for serving this purpose. Moreover, only one has received considerable attention in the literature (Anshel, 1990). This package is referred to as the COPE and involves athletes following four main principles when they are presented with acute sources of stress. In accordance with findings that athletes employ a variety of strategies to cope with acute stressors (Gould *et al.*, 1993a; Gould, Eklund, & Jackson, 1993b; Nicholls *et al.*, 2005b; Polman & Nicholls, 2008), the COPE principles encourage athletes to employ the use of a number of different cognitive and behavioural strategies in a sequential order when presented with stressors. Athletes are encouraged, firstly to Control their emotions, then Organise the input, extracting essential information and filtering out unwanted information, then Plan what they are going to do, and, finally Execute a response.

In order to determine the effectiveness of the COPE principles, Anshel (1990) examined its effect on tennis players' (n=12) accuracy when playing forehand and backhand strokes to a target, under acutely stressful conditions. Acute stress was manipulated through the delivery of false negative feedback and information that the drill would determine player ranking for the year. The COPE training was administered over the course of six one hour sessions. Mood and accuracy were assessed before and after the intervention. Partial support was found for the use of the COPE principles in acutely stressful conditions. Findings indicated that tennis players' performance and positive mood states significantly improved after the delivery of the COPE principles. Moreover, negative mood states significantly reduced. However, although these findings appeared to lend credence to the use of the COPE principles the study was fundamentally flawed as no control group was employed. This made it difficult to determine if the results were due to the administration of the intervention, or a learning effect.

Upon overcoming these methodological limitations findings from further studies provide support for the COPE principles. For example, when Brown *et al.* (1993) compared the effect of the COPE strategy with progressive muscular relaxation (PMR) and no strategies (control group) on dart throwing performance, emotional responses and muscular relaxation, findings indicated that participants who adopted the use of the COPE principles performed better than the control and PMR groups. Differences in emotional responses, however, were not found between the three groups. This was attributed to the fact that the COPE is, by definition, a problem focussed coping strategy. Therefore, it was argued that its effectiveness was demonstrated most in behavioural outcomes rather than emotional responses. Another study by Anshel, Gregory, and Kaczmarek (1990) also found support for the COPE principles. They found that participants who used the COPE principles, when experiencing negative feedback, perceived themselves to have coped better, felt less upset, experienced less fear of appearing incompetent, were less afraid of negative evaluations, and attributed their performance to internal, as opposed to external factors, more than a placebo and control group. Further to this, Anshel (1994) found that participants who used the COPE principles, and one aspect of the intervention, performed better on a pursuit rotor task and experienced less negative affect than a control group. These results provide support for the multi-strategy approach to coping with acute sources of stress. However, it has been argued that there is a need to ascertain the individual contribution of coping strategies on performance and stress management (Anshel, 1990; Brown *et al.*, 1993; Gould *et al.*, 1993a). This sentiment has been echoed in the field of psychological skills training with it being suggested that the individual strategies applied in intervention packages should be examined to determine which is the most facilitative to performance (Greenspan & Feltz, 1989).

Findings from study three indicated that golfers widely use imagery and self-talk as planning strategies to cope with golf strokes under stressful competitive conditions. Planning is a fundamental aspect of the COPE principles and other more general stress management programmes (Anshel, 1990; Ellis, 1977; Meichenbaum & Deffenbacher, 1988). By definition planning is a problem focussed coping strategy (Tenenbaum *et al.*, 2008) and one of the more popular coping methods in both non-sporting (Folkman & Lazarus, 1985) and sporting contexts (Gaudreau *et al.*, 2001). Planning is generally defined as “the ability to think ahead and evaluate the consequences of possible actions” (Rowe, Owen, Johnsrude, & Passingham, 2001, p. 315). Further definitions of planning, in response to stress management specifically, describe it as a time when athletes begin to plan their actions based on previous feedback, when they may assess the credentials of their opponent (if they have one) and correct their own performance (Anshel, 1997). Both imagery and self-talk are crucial to the planning and problem solving process (Maddox, William, & Wheatley, 1987; Vygotsky, 1986). More specifically, athletes widely report the use of imagery and self-talk in sporting settings to help them plan strategies, tactics and execute skills (Bernier & Fournier, 2010; Hardy *et al.*, 2001a; Hall *et al.*, 1998; Munroe *et al.*, 2000).

Research into the transactional theory of stress and coping (Lazarus & Folkman, 1984; Folkman & Lazarus, 1985; Lazarus, 1999) has revealed that problem focussed coping strategies, such as planning, are employed most widely when stressors are perceived to be controllable (Folkman & Lazarus, 1980). This is because people appraise that something can actually be done to change the situation (Folkman & Lazarus, 1980). It has been suggested that golf strokes are largely controllable stressors in comparison to other golf related stressors such as weather conditions (Nicholls *et al*., 2005b). With this in mind it is of little surprise that the golfers in the previous study widely reported the use of imagery and self-talk as problem focussed planning strategies when presented with golf strokes under stressful conditions.

Although findings from study three revealed that golfers widely reported the use of imagery and self-talk to facilitate the planning of golf strokes under stressful conditions, their effectiveness when used in this way warranted further attention. Imagery usage is positively correlated with its perceived effectiveness (Short *et al*., 2007; Weinberg *et al*., 2003) although its relationship with actual effectiveness is unknown. The limited understanding regarding the relationship between use and actual effectiveness is also apparent in the self-talk literature (Hardy *et al*., 2004; Hardy *et al*., 2005a). Therefore, the purpose of this fourth study was to ascertain the actual effectiveness of imagery in isolation, and in conjunction with self-talk, as problem focussed coping strategies when playing golf strokes under stressful conditions. The effectiveness of imagery with and without the use of self-talk in serving this function was examined because although findings from study four revealed that golfers made more of the use of imagery than self-talk as a planning strategy, it has been suggested that self-talk can be used alongside it to add clarity and correction (Cumming *et al*., 2006; Kendall *et al*., 1990). This may be of particular benefit to the planning process as imagery may be the predominant strategy but there may be additive effects associated with the use of self-talk alongside it.

6.2 Method

6.2.1 Design

In accordance with the current research approaches being adopted to determine the effectiveness of different psychological interventions in the extant sport psychology literature a single-subject multiple baseline across individuals design was employed (Callow *et al.*, 2001; Hanton & Jones, 1999b, Kendall *et al.*, 1990; Mellalieu *et al.*, 2009; Thelwell, Greenlees & Western, 2006; Thomas *et al.*, 2007; Nicholls *et al*., 2005c; Rogerson & Hrycaiko, 2002). Typically these designs involve recruiting 3 – 5 participants and recording a dependent variable, or a number of dependent variables, both without, and with the use of an intervention, over an extended period of time (Hrycaiko & Martin, 1996).

This methodology was deemed most appropriate for the current study for several reasons. Firstly, because all participants acted as their own control the ethical issues associated with having a ‘no treatment’ group were eliminated (Hrycaiko & Martin, 1996). Moreover, the nature of the design meant that the performance effects associated with the intervention could be measured over an extended period of time (Hanton & Jones, 1999b; Hrycaiko &

Martin, 1996), whilst also allowing for performance consistency to be determined (Thelwell *et al.*, 2006). This was of particular importance as the ability to cope with acute sources of stress has been identified as a determinant of performance consistency (Brown *et al.*, 1993). Additionally, this study required a significant commitment from the participants recruited. This would have consequently made it difficult to adopt a traditional nomothetic design. Finally, and most importantly, this type of design allowed for the problems associated with the manipulation of acute sources of stress in stringently controlled laboratory settings to be eliminated, as data were collected in ecologically valid situations. It can be difficult to manipulate stress in laboratory conditions for two reasons. Firstly, there is huge variability between individuals in what they perceive to be stressful (Folkman & Lazarus, 1984; McGrath, 1970). Secondly, the manipulation of stress in laboratory controlled conditions compromises the ecological validity of research findings (Hill *et al*., 2010).

Many different models of single-subject multiple baseline across individuals designs exist, although an ABC design was deemed to be most appropriate for the purpose of the current study (Kazdin, 1982; Trittenwein, 1998). Phase A involves the collection of baseline data without the use of any interventions. Phases B and C see the introduction of different interventions, in the same order, whilst still collecting the same performance measures to those in the baseline phase. Data can then be compared across the three phases. This design was deemed appropriate for the current study as its purpose was to examine the effect of the use of imagery in isolation, and in combination with self-talk, on the performance of golf strokes under stressful competitive conditions. As such, the individual contribution of the strategies could be determined, overcoming some of the issues associated with the delivery of multiple interventions in one package (Bryan, 1987).

Performance measures were recorded over a minimum of eight competitions. Scores were only recorded for single player competitions (e.g., strokeplay, stableford, medal), played over 18 holes on the golfers' home course. In these competitions participants were asked to record their total number of fairways and greens hit in regulation, the total number of putts taken, the percentage of golf strokes that were successfully executed under stressful conditions and their total score for the round. These variables were recorded because golfers routinely record them, they are commonly used on the PGA tour (pgatour.com, 2010) and have previously been applied as golf performance indicators in experimental research (Cohn *et al*., 1990). Finally, this collection of performance measures was deemed to provide the best indication of the effectiveness of the strategies on performance consistency.

The percentage of golf strokes successfully executed under stressful conditions was calculated using a method similar to that used by Nicholls *et al*. (2005c). Participants were asked to record the number of stressful golf strokes that they had encountered on each hole during each competition, and then indicate how many of these they felt they had successfully executed. The percentage of golf strokes successfully executed under stressful conditions was then calculated to determine the effectiveness of the coping strategy employed. The advantage of this method was that participants were able to make their own judgements about whether they found particular shots stressful. This supported the individuality of the experience of stress (Folkman & Lazarus, 1984; McGrath, 1970).

6.2.2 Participants

Ethical approval was gained from the School Ethics Committee. Subsequently, four competitive male golfers were recruited for the study. All participants were either skilled or semi skilled (3.1 – 11 handicap) according to handicap classifications (HandicapMaster, 2010) and competed in at least two competitions a week. The participants recruited were not of an elite standard. This was because it can be difficult to determine the effectiveness of psychological strategies with this population as the margin for improvement can be extremely small (Nicholls *et al*., 2005c). The participants' age and playing experience ranged from 18-62 years old and 5-23 years respectively. None of the participants reported having any experience of psychological skills training, apart from participant A who had completed an A level in Physical Education and had some knowledge of the concept. However, he had not actually experienced any training himself.

The selection of participants was based on questionnaire responses from study four. Selection criteria included either minimal use of imagery and self-talk as planning strategies, or a tendency to employ their use to enhance the technique of the golf stroke. Additionally, prior to collecting performance measures with the use of imagery, all participants had to demonstrate sufficient imagery ability. Participants completed the Movement Imagery Questionnaire-Revised (MIQ-R) (Hall & Martin, 1997) (Appendix 21) to determine their basal visual and kinesthetic imagery ability. It is important to determine athletes' imagery ability before the commencement of imagery training sessions as it is a determinant of performance enhancement (Hall, 1998). The MIQ-R consists of eight items. Four of the eight items assess visual imagery ability, whilst four assess kinesthetic imagery ability. Responses are gauged on a 7 point Likert scale from 1 (very hard to 'see', feel) to 7 (very easy to 'see', feel). A score of 16 or less has been identified as the minimum that athletes should attain if they wish to be considered in a study (Callow *et al.,* 2001). The psychometric properties of the MIQ-R have been supported by Hall and Martin (1997) who found evidence to support the convergent validity of the questionnaire, finding strong correlations between the MIQ-R and MIQ for both subscales (visual, r = -.77; kinesthetic, r = -.77) (correlations are negative as the Likert scales were anchored in different directions). Additionally, both subscales have been found to have sufficient internal consistency (visual = 0.79; kinesthetic = 0.79) (Vadocz *et al*., 1997).

All participants, except participant D, demonstrated the required level of visual and kinaesthetic imagery ability prior to the commencement of baseline data collection. During this phase, participant D failed to meet the requisite score for kinaesthetic imagery ability (16). Consequently a similar course of action was taken to that by Callow *et al*. (2001). Participant D was re-issued with the MIQ-R scale again one week after the commencement of the imagery training, prior to the recording of performance measures, with the use of the strategy. This imagery training focussed on equipping the participants with the skills to create both vivid and controlled images which are fundamental to imagery ability. Upon completing the questionnaire on the second occasion, participant D attained the required imagery ability for the study.

6.2.3 Procedure

A list of potential participants was compiled, based on questionnaire responses from study four. Potential participants were contacted via telephone/email at the end of July 2010 and asked if they would be interested in taking part in a further study examining the effect of imagery and self-talk training on the performance of golf strokes under stressful conditions. Interested respondents were invited to a meeting where the nature of the research project was outlined to them and a participant information sheet was issued (Appendix 22). During this meeting they were also informed that their participation in the study was dependent on their ability to compete in 12 – 16 competitions over a minimum of a six week period. This volume of competitions was selected as it was deemed to provide a more than sufficient amount of time for performance to be assessed with, and without the interventions. Single-subject multiple baseline across individuals designs, typically, vary in length with some researchers recording measurements across 9 competitions (Thelwell *et al.*, 2006) whilst others have used up to 28 – 37 competitions (Nicholls *et al.*, 2005c; Rogerson & Hrycaiko, 2002). Consequently, four participants volunteered and provided informed consent for the study.

As with group designs, the purpose of single-subject multiple baseline across individuals designs is to compare performance with and without the use of psychological interventions. In order to ensure that performance scores were comparable across all phases, participants were instructed to record only their performance scores for full eighteen hole single competitions (e.g., strokeplay, stableford, medal) played on the same course. Despite these instructions owing to unforeseen circumstances (poor weather conditions and cancelled competitions) participant C was forced to record his last five performance measures in competitions played on winter greens, which made comparisons more difficult.

Prior to data collection, all participants were provided with the same instructions for recording the number of putts, fairways and greens hit in regulation, percentage of stressful strokes successfully executed and total scores for the round (Appendix 23). Participants were then issued with score cards to record their performance measures for each competition (Appendix 24) and were instructed to text, ring or email through their recorded scores after each competition. The purpose of asking the participants to do this was two-fold. Firstly, it ensured that an accurate database of all scores was recorded, to account for lost score cards or confusion. Secondly, and more importantly, it allowed the researcher to track the stabilisation of the performance measures. Once golfers had completed the cards and sent through their results, they were asked to place them in sealed envelopes. This was to ensure that golfers were not tracking their own scores or manipulating their results. These sealed envelopes, containing performance scores, were collected at the end of each phase of the study.

In accordance with recommendations for single-subject multiple baseline across individuals designs, the administration of the imagery and self-talk interventions was staggered (Kazdin, 1982). This ensured that the changes in performance could confidently be attributed to the administration of the intervention, rather than historical effects (Bell, Skinner, & Fisher, 2009; Hanton & Jones, 1999a; Kazdin, 1982; Thomas *et al.*, 2007). In compliance with existing recommendations (Hanton & Jones, 1999b; Hrycaiko & Martin, 1996; Thomas *et al.*, 2007), attempts were also made to withhold the delivery of the interventions until the stabilisation, or, movement of the dependent variables in the opposite direction to that expected from the intervention. However, due to the variable nature of golf performance and the number of measures being taken, the interventions were applied in consideration of the participants' schedule and when there was an indication that three out of the five measures had stabilised, or were moving in the opposite direction. This course of action was in compliance with the previous practice of Trittenwein (1998). In order to increase the chance that golfers' performances would be stable across the baseline phase, data collection began towards the end of July. This ensured that participants had already played in a significant number of competitions before the study began. Table 6.1 displays the number of recordings that were taken during each phase of the study.

Table 6.1: Number of performance recordings taken during each phase of the study

Participant	Baseline	Imagery	Imagery and self-talk	Total
A	4	5	3	12
B	4	2	4	10
C	3	3	4	10
D	3	2	3	8

During each intervention phase, adherence to the training and use of imagery in isolation, and with self-talk, was ensured through weekly contact. All training sessions were administered at least two days before competition. Finally, in compliance with many of the previous single-subject multiple baseline across individuals designs, three social validation questionnaires were issued as the end of the baseline (Appendix 25), imagery only (Appendix 26), and, imagery with self-talk phases (Appendix 27) (Hanton & Jones, 1999b; Pates *et al.*, 2001; Rogerson & Hrycaiko, 2002; Thelwell & Greenlees, 2001; Thomas *et al.*, 2007). The purpose of these questionnaires was to determine a) the perceived effectiveness of imagery in isolation, and with self-talk b) how participants felt prior to the execution of strokes under stressful conditions with the use of the strategies and c) golfers' adherence to the use and practice of the strategies. Upon completion of the study all participants were issued with a participant debrief document (Appendix 28).

6.2.4 Intervention

The interventions used in the present study were supported by findings from studies two, three and four and existing peer reviewed research. Findings from descriptive studies have led to the development of successful multi-strategy psychological interventions in the past (Hanton & Jones, 1999b; Thomas *et al.*, 2007), although to date, few studies have developed interventions for use during competition. The current study sought to address this under researched area by examining the effect of equipping golfers with imagery and self-talk skills to facilitate the planning of golf strokes under stressful conditions during competition.

The decision to develop an intervention for use in response to golf strokes under stressful conditions only was taken for two reasons. Firstly, findings from studies two and three indicated that golfers reported the use of imagery and self-talk most, when they were presented with stressful golf strokes. As such, it was deemed necessary to determine the effectiveness of the strategies when used in these situations. Secondly, it was felt that the conscious use of the strategies prior to the production of every golf stroke could disrupt their automatic execution. It is widely accepted that peak golfing performance is associated with the autonomous execution of skills (Cohn, 1990; Crews & Landers, 1993; Gallwey, 1979; McCaeffrey & Orlick, 1989). However, the experience of stress can disrupt the autonomous execution of skills (Crews, 2001). Coping is recognised as a conscious activity (Anshel, 2001). Consequently, it was deemed necessary to equip golfers with strategies to use only when this disruption had occurred.

The intervention was delivered in two sessions and phases. Firstly, the participants were taken through the imagery training. The reason for this was that the golfers in study four reported imagery as their most predominant coping strategy when presented with golf strokes under stressful conditions. As such, it was necessary to determine its performance effects in isolation. In accordance with recommendations by Hrycaiko and Martin (1996), both the imagery (Appendix 29) and self-talk interventions (Appendix 30) were accompanied with handouts and audio disks and followed the same format. The proposed intervention programme, and accompanying handouts, were endorsed by a BPS chartered sport psychologist and were formulated based on existing usage findings.

6.2.4.1 Phase 1: Imagery

Participants were provided firstly with generic information defining imagery and showing its importance and uses. The different imagery perspectives were then discussed with the participants. As a result of the existing ambiguity regarding the effectiveness of each perspective, in accordance with Gordon *et al.* (1994), participants were instructed to use the perspective that they felt most comfortable with. Participants were then informed about the importance of creating both vivid and controlled images. Vividness and controllability have been identified as central to the effectiveness of imagery training programmes (Vealey & Greenleaf, 2010). The participants were guided through some exercises to train their imagery ability, and were provided with exercises to practice at home three times a week.

Once the participants had undergone the generic imagery training, they were provided with specific guidelines to facilitate their use of imagery during competition to plan golf strokes that they perceived to be stressful. Firstly, participants were informed that when they were presented with such a golf stroke, they should start creating images of how to play the stroke, once they could see the golf ball in its surroundings, approximately 30-40 yards before they reached it. The use of the walking period to formulate images of shots was informed by findings from study four, and Bernier and Fournier (2010).

In further compliance with existing research, participants were encouraged to adopt the use of vivid, positive and externally focussed images (Bernier & Founier, 2010; Vealey & Greenleaf, 2010; Woolfok *et al*, 1985b). Moreover, they were informed that they may have to imagine a number of different shot options, before they imagined a shot that they felt would be most appropriate for the situation (Berneir & Fournier, 2010). Although the optimum attentional focus for the creation of images is under-researched, findings from both study four and Bernier and Fournier (2010) indicated that golfers should adopt an external focus rather than an internal focus, to allow for natural control mechanisms to be used (McNevin *et al.*, 2003). With this in mind, golfers were specifically instructed to imagine the trajectory of the ball and how it would respond in the prevailing conditions.

The recommendation that golfers should imagine a variety of different shot options is at odds with previous imagery interventions that have relied on the administration of imagery scripts with set outcomes (Cumming *et al.*, 2006; Short *et al.*, 2002; Taylor & Shaw, 2002; Nicholls *et al*., 2005c). Although these imagery scripts have largely been effective in improving the performance of closed skills in unchanging environments, it was felt that they did not lend themselves to use in response to golf strokes under stressful conditions. This is because perceptions of stress, within and between people, vary hugely (Lazarus & Folkman, 1984), as do the nature of the pressurising situations (Weinberg *et al.*, 2003).

6.2.4.2 Phase 2: Self-talk

Once participants were proficient in the use of imagery, and had recorded their performance with the use of this strategy independently, the self-talk phase of the training was introduced. In accordance with findings from study two, and existing recommendations for self-talk use (Cumming *et al.*, 2006; Kendall *et al.*, 1990), golfers were provided with guidelines for the use of self-talk alongside imagery.

As with the imagery training, participants were provided with an introduction defining self-talk, and showing its importance and uses. In particular, they were informed that they were going to be issued with guidelines for using self-talk just after the use of imagery, to facilitate the planning of golf strokes under stressful conditions. The two ways in which self-talk could then be used in this planning process were then discussed. Participants were firstly informed that they could use self-talk to add clarity to and reaffirm the shot they had imagined and intended to play. They were then told that they could use self-talk to correct imagined shots and direct themselves to other shot options.

Once again, because of the variable nature of the situations that the participants would be presented with, they were not provided with specific self-talk phrases or scripts. This was deemed to be the most beneficial format for the presentation of the information, as previous research has suggested that self-talk statements should be self prescribed (Harvey *et al.*, 2000). In order to ensure the effective use of self-talk in facilitating the planning process, several guidelines were presented. Firstly, participants were instructed to ensure that their self-talk statements were short (a few words). The reason for this was that the use of longer statements could be detrimental, as they could overload attentional processes (Magill, 2007). Secondly, participants were told to keep their self statements positive, rather than using statements that instructed them to avoid certain aspects of the golf course. This was because statements that actively direct participants' attention away from certain features, can lead to the occurrence of ironic processing (Hall, 1999). As with imagery, golfers were instructed to adopt an external self-talk focus rather than an internal focus. This was because the purpose of the strategy was to reaffirm or correct what had been imagined from an external perspective. Furthermore, it has been proposed that the adoption of internally focussed self-talk can lead to the over conscious analysis of skills (Hardy *et al.*, 2005a).

6.2.5 Data analysis

Data from single-subject multiple baseline across individuals designs were analysed via 'visual inspection.' Hrycaiko and Martin (1996) provided guidelines to facilitate the analysis process and the accurate determination of treatment effects. Specifically, they proposed that determinations about the effectiveness of interventions should be made based on:

a) The number of overlapping data points between the baseline and the intervention. Specifically, the intervention effect is greater if there are fewer overlapping data points.
b) How immediate the effect of the intervention is. If there is a very large increase in performance on the dependent variable straight after the administration of the treatment it can be concluded that the effect is due to the administration of the intervention and not other extraneous factors.
c) The size of the effect seen. The larger the effect the more successful the intervention is deemed to be.
d) The consistency of the effect across all participants. If all participants present the same pattern of responses it can be concluded that the effects seen are due to the administration of the intervention.

Additionally, means and standards deviations, for each participant's performance measures during each phase of the study, were determined to assess whether general trends, and within participant performance consistency, had changed with the introduction of the intervention.

7.3 Results

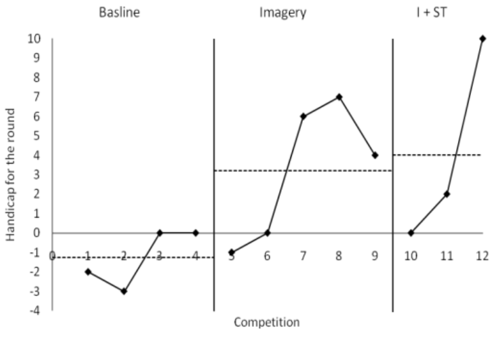
7.3.1 Performance measures

The following results section will present each participant's performance measures at baseline, with the use of imagery only, and in combination with self-talk. The last five of participant C's performance measures are displayed in red as these data were collected from winter green competitions. Participants' subjective perceptions about the interventions will also be presented.

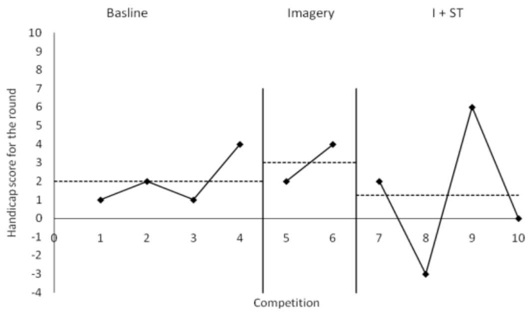
6.3.1.1 Handicap scores

Figure 6.1 illustrates each participant's performance in relation to their handicap across the three phases of the study. Lower scores denote better performance. Table 6.2 presents each participant's mean (SD) performance in relation to their handicap for each phase of the study. The standard deviations indicate whether the variability of performance changed with the administration of the intervention.

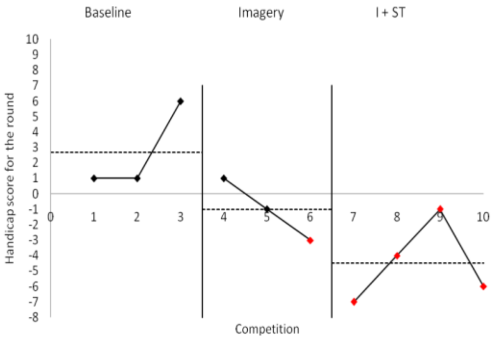
Participant A



Participant B



Participant C



Participant D

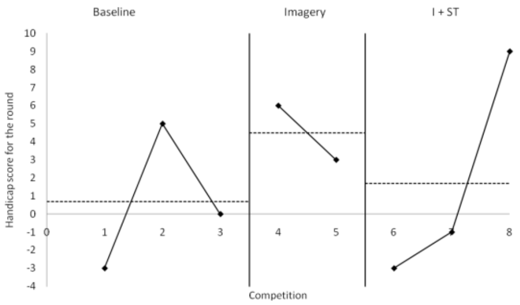


Figure 6.1: Performance in relation to handicap across competitions for participants A, B, C and D

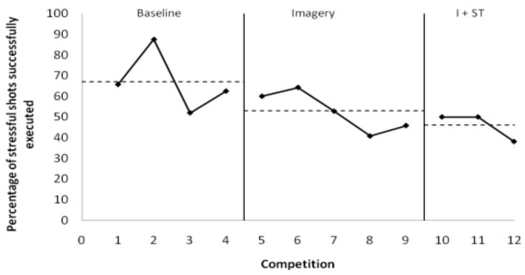
Table 6.2: Mean (SD) performance in relation to handicap for each participant during each phase of the study

	A	B	C	D
Baseline	-1.3 (1.5)	+2.0 (1.4)	+2.7 (2.9)	+0.7 (4.0)
Imagery	+3.2 (3.6)	+3.0 (1.4)	-1.0 (2.0)	+4.5 (2.1)
Imagery and self-talk	+4.0 (5.3)	+1.3 (3.8)	-4.5 (2.6)	+1.7 (6.4)

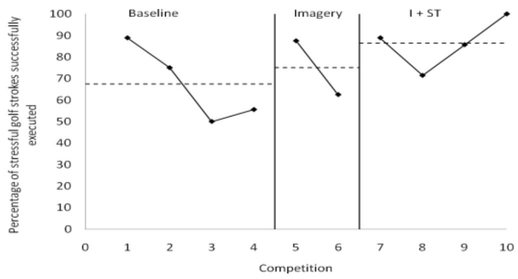
6.3.1.2 Percentage of stressful golf strokes successfully executed

Figure 6.2 and Table 6.3 illustrate how participants' self perceived performance of golf strokes under stressful conditions changed over the course of the study. Higher values denote a self perceived improvement in the performance of golf strokes under stressful conditions.

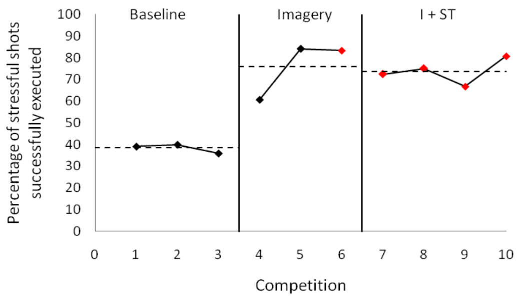
Participant A



Participant B



Participant C



Participant D

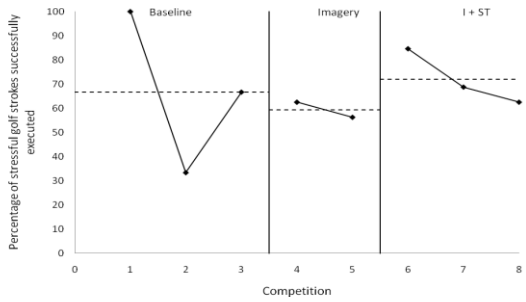


Figure 6.2: Percentage of golf strokes under stressful conditions successfully executed across competitions for participants A, B, C and D

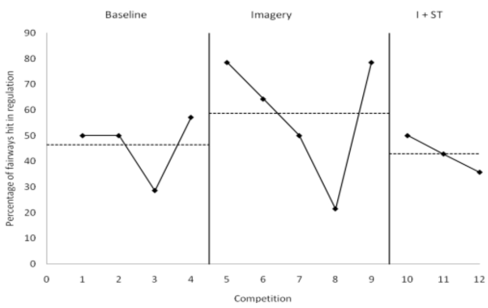
Table 6.3: Mean (SD) percentage of golf strokes successfully executed under stressful conditions for each participant during each phase of the study

	A	B	C	D
Baseline	66.7% (14.9)	67.4% (17.9)	38.4% (2.1)	66.7% (33.3)
Imagery	52.7% (9.7)	75.0% (17.5)	76.0% (13.3)	59.4% (14.9)
Imagery and self-talk	46.0% (6.9)	86.5% (11.8)	73.7% (5.9)	72.0% (12.2)

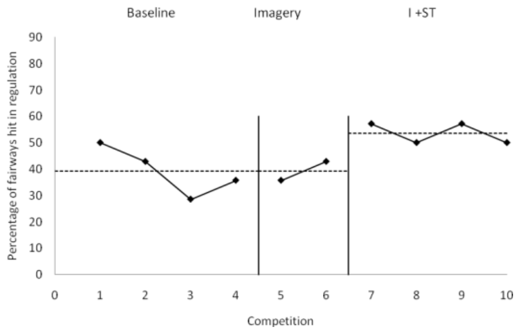
6.3.1.3 Percentage of fairways hit in regulation

Figure 6.3 and Table 6.4 illustrate the percentage of fairways hit in regulation over the course of the three phases of the study. Higher scores indicate better performance.

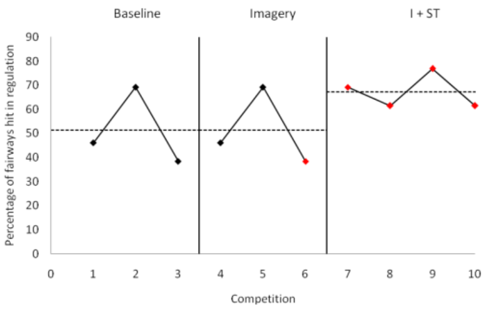
Participant A



Participant B



Participant C



Participant D

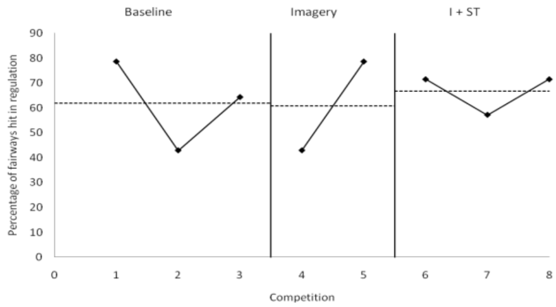


Figure 6.3: Percentage of fairways hit in regulation across competitions for participants A, B, C and D

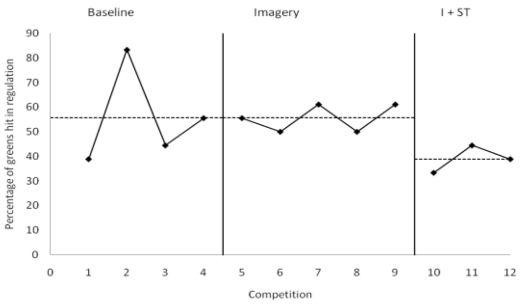
Table 6.4: Mean (SD) percentage of fairways hit in regulation for each participant during each phase of the study

	A	B	C	D
Baseline	46.4 (12.4)	39.3 (9.2)	51.3 (16.0)	61.9 (18.0)
Imagery	58.6 (23.9)	39.3 (5.1)	51.3 (16.0)	60.7 (25.3)
Imagery and self-talk	42.9 (7.1)	53.6 (4.1)	67.3 (7.4)	66.7 (8.2)

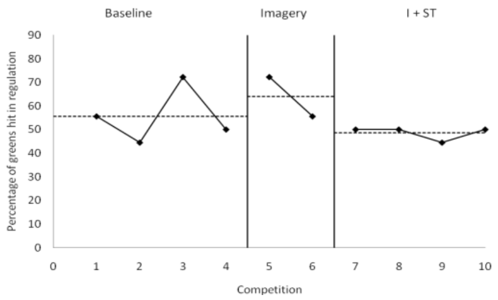
6.3.1.4 Percentage of greens hit in regulation

Figure 6.4 and Table 6.5 illustrate the percentage of greens hit in regulation over the course of the three phases of the study. Higher scores indicate better performance.

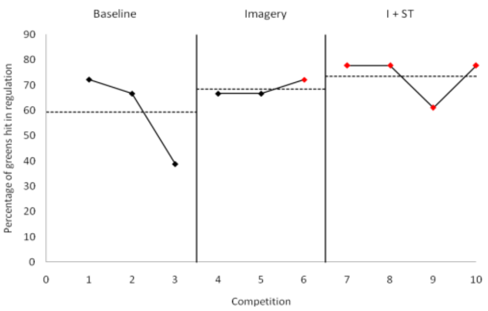
Participant A



Participant B



Participant C



Participant D

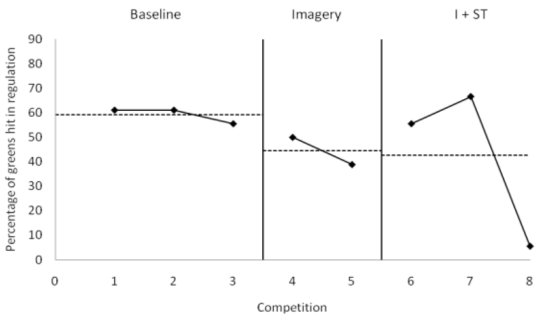


Figure 6.4: Percentage of greens hit in regulation across competitions for participants A, B, C and D

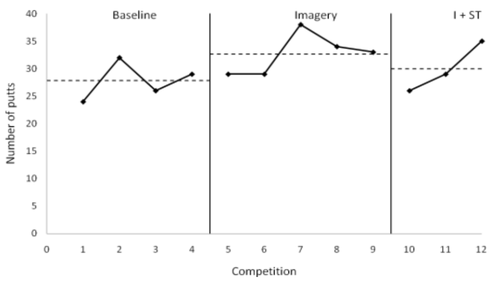
Table 6.5: Mean (SD) percentage of greens hit in regulation for each participant during each phase of the study

	A	B	C	D
Baseline	55.6 (19.8)	55.6 (14.0)	59.3 (17.9)	59.3 (3.2)
Imagery	55.6 (5.6)	63.9 (11.8)	68.5 (3.2)	44.4 (7.9)
Imagery and self-talk	38.9 (5.6)	48.6 (2.8)	73.6 (8.3)	42.6 (32.6)

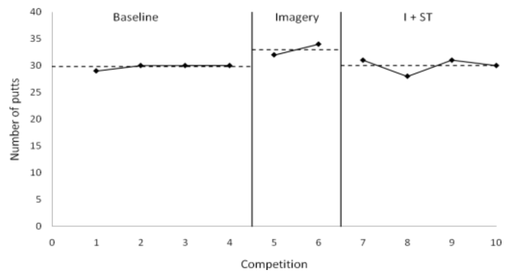
6.3.1.5 Total number of putts per round

Figure 6.5 and Table 6.6 illustrate the number of putts taken over the course of the three phases of the study. Lower scores indicate better performance.

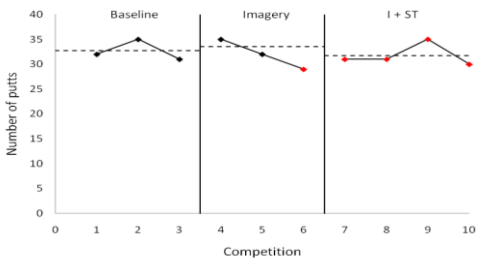
Participant A



Participant B



Participant C



Participant D

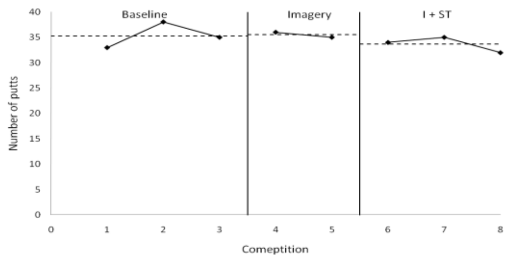


Figure 6.5: Total number of putts across competitions for participants A, B, C and D

Table 6.6: Mean (SD) total number of putts for each participant during each phase of the study

	A	B	C	D
Baseline	27.8 (3.5)	29.8 (0.5)	32.7 (2.1)	35.3 (2.5)
Imagery	32.6 (3.8)	33.0 (1.4)	33.5 (3.0)	35.5 (1.0)
Imagery and self-talk	30.0 (4.6)	30.0 (1.4)	31.5 (2.2)	33.7(1.4)

6.3.1.6 Summary of performance measures

In accordance with the guidelines presented for the analysis of single-subject multiple baseline across individuals data (Hrycaiko & Martin, 1996), there was little support for the use of imagery in isolation, and in combination with self-talk, in facilitating the performance of golf strokes under stressful conditions, total scores for the round, fairways and greens hit in regulation or putting performance. Many of the results were characterised by inconsistent findings between participants, overlapping data points, and limited immediate and sizeable effects with the use of the interventions.

The only performance variable that displayed any sign of improvement with the use of imagery in isolation, and in combination with self-talk, was the performance of golf strokes under stressful conditions. Participant C experienced immediate and clean improvements in his self perceived performance of stressful golf strokes with the use of both imagery, and imagery with self-talk. Additionally, participant B appeared to experience improvements with the use of imagery and self-talk together. However, despite these improvements, the findings were in violation of the guidelines for the analysis of single-subject multiple baseline across individuals data. They must therefore be considered with some caution. Finally, it is important to note that although participant C’s initial results appeared supportive of the use of imagery, the additive effects of imagery and self-talk together were difficult to determine, as he competed in the latter five competitions on winter greens. This makes comparisons with the data from different phases difficult.

6.3.2 Subjective experiences

The following results section details the perceived effectiveness of the interventions and presents the potential factors influencing their success or failure. These responses were gained from the social validation questionnaires that were issued at the end of each phase of data collection. Table 6.7 provides some insight into the psychological state of the participants during the different phases of the study.

Table 6.7: Psychological state of the participants prior to the production of golf strokes under stressful conditions during each phase of the study

	A	B	C	D
I have been nervous about playing stressful golf strokes				
Baseline	2	2	4	2
Imagery	2	2	1	2
Imagery and self-talk	2	2	2	1
I have been confident when playing stressful golf strokes				
Baseline	4	4	2	4
Imagery	4	4	4	3
Imagery and self-talk	4	4	4	4
I have been focused when playing stressful golf strokes				
Baseline	5	3	3	3
Imagery	4	4	4	1
Imagery and self-talk	4	4	4	5
I have been motivated when playing stressful golf strokes				
Baseline	4	4	3	4
Imagery	4	4	5	2
Imagery and self-talk	4	5	4	4
I have been clear about how I plan about how to play stressful golf strokes				
Baseline	2	3	3	4
Imagery	4	4	4	2
Imagery and self-talk	4	5	5	5

Note: responses were provided on a 5 point Likert scale 1 = not at all, 5 = Extremely

Findings indicated that participants felt that the use of imagery in isolation, and with self-talk, was most effective in providing them with a clear plan about how to play the golf strokes with which they were presented. Furthermore, there was also an indication that the use of the strategies allowed participants to feel more focussed when playing golf strokes under stressful conditions. No other differences in the participants' psychological states were found across the different phases of the study.

Table 6.8 provides further insight into participants' perceptions about the effectiveness of imagery in isolation, and with self-talk. Key findings of interest were that the participants found the practice, and use, of imagery, both in isolation and combination with self-talk, enjoyable and beneficial to performance. Furthermore, participants indicated that the use of self-talk added clarity to imagined golf strokes. Moreover, all participants felt that their performance of golf strokes under stressful conditions improved with the use of imagery and self-talk together.

Table 6.8: Perceptions about the effectiveness of imagery in isolation and in combination with self-talk

	A	B	C	D
I feel my overall performance has improved since using:-				
Imagery	2	4	5	4
Imagery and self-talk	3	4	5	4
I feel I am performing more consistently since using:-				
Imagery	2	3	5	3
Imagery and self-talk	4	3	5	5
My performance of stressful golf strokes has improved since using:-				
Imagery	3	4	5	4
Imagery and self-talk	4	4	5	4
I have found the use of imagery useful	4	4	5	4
I have found the use of imagery and self-talk together useful	3	5	5	5
I have found the imagery the training enjoyable	3	5	5	4
I have found the imagery and self-talk training together enjoyable	3	5	5	5
I am pleased with the results of the imagery training	2	4	5	4
I am pleased with the results of the imagery and self-talk training together	3	5	5	4
I will continue to use imagery	5	4	5	4
I will continue to use imagery and self-talk together	4	4	5	4
The use of self-talk:-				
Made my imagery clearer	4	5	4	4
Made my decisions about my shot choice clearer	4	5	4	4
Helped me correct incorrect images	3	4	4	3
My performance of stressful golf strokes was best when I used:-	I + ST	I + ST	I + ST	I + ST

Note: responses answered on a 5 point Likert scale 1 = not at all or strongly disagree, 5 = Extremely or strongly agree

Responses to open ended questions revealed that Participant B felt he had a much more relaxed approach to competitions and felt more comfortable knowing that he had the strategies in reserve for use. Participant D also stated that he had enjoyed the project and would continue to focus on planning shots and visualising shot options. Interestingly, performance data provided no support for the use of the intervention for participant A. However, the open ended questions provide some indication as to why this may have been. Phase two saw a rapid decline in Participant A's performance. At the end of phase two participant A suggested that he had developed concerns over his putting and intimated that he had been internally over-thinking his technique. Inspection of the putting data corroborated this. At the end of phase three, participant A completed another social validation questionnaire. During phase three, he reported that he had experienced a decrease in motivation after a bad spell of games, which he had found difficult to recover from. This may provide some explanation as to why his performance moved in an opposite direction to that expected from the intervention.

Finally, in order to determine participant adherence to the training and use of the strategies, the questions in Table 6.9 were asked at the end of each phase. Although all participants had adhered to the use and training of the strategies, findings from open ended questions also indicated that all of the participants had been using other imagery and self-talk methods during all phases of the study. Moreover, during the ‘imagery only’ phase of the study, two of the four golfers reported naturally using self-talk to accompany imagined shots.

Table 6.9: Training adherence and disruption

	A	B	C	D
I have adhered to the practice of imagery	5	4	5	5
I have adhered to the practice of imagery and self-talk together	5	4	5	5
I have adhered to using imagery during competitions	5	4	5	4
I have adhered to using imagery and self-talk together during competitions	5	4	5	5
Taking recordings of my performance has disrupted the way that I play	1	1	3	1

Note: *responses answered on a 5 point Likert scale 1 = strongly disagree, 5 = strongly agree*

6.4 Discussion

The overall purpose of this thesis was to identify the predominant factors influencing golfers’ combined and independent usage of imagery and self-talk. Findings leading up to this fourth study revealed that golfers’ usage of imagery and self-talk were predominantly influenced by contextual and functional factors. To exemplify this influence, findings indicated that golfers employed both strategies more in competition than practice. Moreover, rather than employing the strategies as part of a consistent pre-shot routine golfers were found to emphasise their use when playing particular golf strokes. Findings from part A of study three indicated that these golf strokes were by definition stressful which indicated that golfers were making use of imagery and self-talk as coping strategies. Part B of study three found that when golfers used imagery and self-talk as coping strategies they predominantly made use of them as problem focussed planning strategies. Owing to the importance that golfers placed on the usage of the strategies in this way, the purpose of this final study was to determine the performance effects associated with the use of imagery and self-talk as problem focussed planning strategies when playing golf strokes under stressful conditions.

6.4.1 The impact of imagery and self-talk on the performance of golf strokes under stressful competitive conditions

Participants subjectively reported that they found the use of imagery and self-talk of benefit when performing golf strokes under stressful competitive conditions. More specifically, they indicated that they felt more focussed and better able to create clear plans of how to play golf strokes under stressful conditions. Other psychological constructs such as confidence, nerve control and motivation were not found to have been affected by the use of the strategies. This however was more than likely due to the fact that the intervention was problem focussed. It has been proposed that the effects of problem focussed coping strategies may present themselves more prominently in behavioural outcomes rather than emotional outcomes (Brown *et al.*, 1993). Despite this, results from the objective performance measures recorded provided little support for the use of the strategies with performance on only one (percentage of stressful golf strokes successfully executed) out of the five dependent variables showing any sign of improvement with their use. Furthermore, it must be noted that improvements in this variable were characterised by a number of overlapping data points and inconsistencies across participants. This raised concerns about how ‘true’ the effect observed was.

There are several possible reasons why performance effects were not observed with the usage of the strategies, and why there was a mis-match between participants’ perceptions of the intervention and the minimal improvements observed. Firstly, the nature of the intervention applied may explain why performance effects, all be them inconsistent, were only apparent on the performance of golf strokes under stressful conditions. The intervention was specifically developed to facilitate the performance of golf strokes under stressful conditions. Participants were, therefore, instructed to use the strategies only on golf strokes that they perceived to be stressful. Consequently, it is logical that the positive effects associated with the use of strategies were most prominent on this dependent variable. Moreover, it is possible that positive performance effects were not found across all dependent variables because participants were not employing the strategies frequently enough. To exemplify this, one participant reported being presented with only six golf strokes that he perceived to be stressful during the course of a whole round. This may have meant that he used the strategies only six times. This low usage could have meant that the participants were unlikely to experience improvements across all performance measures, such as total scores for the round or greens hit in regulation performance.

Additionally, there are several issues pertaining to the use of single-subject multiple baseline across individuals designs that may explain why the performance improvements gained were minimal. Firstly, weather conditions and cancelled fixtures made the twelve competition scores that were desired unattainable. This meant that performance effects were determined across only a limited number of competitions. The successful collection of competitive data in field-based research is a common issue (Johnson *et al*., 2004; Landin & Herbert, 1999; Munroe et al., 2005). However, it had direct consequences for the current study as it has been suggested that the employment of new routines in golf need sufficient time and practice to embed, before performance improvements may be observed (Cohn *et al*., 1990).

Along with this consideration, inspection of the baseline performance and psychological state data provided some indication that ceiling effects could have occurred. This is demonstrated most clearly on the stressful golf stroke performance measures. Although two of the golfers experienced improvements on this variable, others did not. However, this may have been because they rated themselves very highly in the baseline measures. Therefore, although participants may have felt that they were dealing with the stressors more successfully during the intervention phase, there was no way to determine this numerically.

As well as considering the issues associated with design another explanation why performance effects were limited may stem from the natural variability associated with golf performance. It is well understood that one of most common battles that golfers face is the ability to perform consistently; however research has indicated that performance variability is higher amongst less skilled golfers (Perkin-Ceccato *et al*., 2003). With the exception of participant A, all of the participants recruited were, by definition, semi-skilled. As such, true performance effects may have been difficult to determine in the participants recruited in the current study, because of the natural variability associated with their skill level. Despite this understanding however, the recruitment of highly skilled golfers may have also had it problems as Nicholls *et al*. (2005c) argued that margins for improvement with this population can be minimal.

The final explanation for why performance effects were not found with the use of imagery and self-talk as problem focussed coping strategies may be that they were actually ineffective. The intervention applied in the current study was designed based on how golfers reported using the strategies in the formative studies. Consequently, it is possible that golfers do not make use of imagery and self-talk in the most appropriate way. They may however perceive their usage to be of benefit to performance which is why they use them. Findings from the current study support this proposal as all participants perceived their performance to have improved with the use of imagery and self-talk even though it had not. This mis-match between perceived and actual performance can be explained by the participants' 'expectations' of the intervention. It is conceivable that the participants expected performance to improve with the administration of the intervention. Consequently, they may have felt as though they were performing better with the use of imagery and self-talk, even though they were not in reality. There is evidence in the extant literature to support this explanation (Butler & Baumeister, 1998). Upon finding that participants performed consistently worse with the presence of a supportive audience, but perceived the supportive audience to be more beneficial to performance than an unsupportive audience, Butler and Baumeister (1998) attributed this ironic finding to the participants' expectations of the effect of the supportive audience.

Although performance effects in the current study were difficult to determine for a variety of reasons, results did appear to suggest that imagery and self-talk as problem focussed coping strategies were ineffective in improving the performance of golf strokes under stressful conditions. Findings from this study are of practical importance as results from part B of study three demonstrated that golfers have a preference for adopting the use of imagery and self-talk as problem focussed coping strategies, and perceive them to be beneficial to performance, even though they are not. Consequently, it is useful for sport psychologists to be aware of golfers' habitual ineffective preferences for the usage of imagery and self-talk so that they can look to develop more effective interventions.

6.4.2 The additive effects associated with the use of imagery and self-talk together

The purpose of the current study was two-fold. Firstly, it sought to determine the effectiveness of imagery and self-talk for coping with golf strokes under stressful conditions. Secondly, it aimed to ascertain whether there were any additive effects associated with the use of the strategies together. Data from the social validation questionnaires indicated that all participants found that the use of self-talk enabled them to create clearer images. Furthermore, they reported feeling that they were better able to create clear plans of how to play golf strokes with the use of the strategies together. Despite this promising subjective data about use, no clear performance effects were obtained with the use of the strategies together compared with imagery in isolation.

A potential reason for the lack of additive effects found with the use of imagery and self-talk together may be due to the fact that the golfers were naturally employing the use of self-talk alongside imagery in the 'imagery only' phase. Two of the golfers openly reported doing this and it is likely that the other two were also experiencing accompanying verbalisations. Existing research has found that it is extremely difficult to control the verbalisations that people have (Hardy *et al.*, 2005b; Theodorakis *et al.*, 2000). Furthermore, theories of processing and learning widely argue that the use of visual and verbal strategies, naturally and sequentially invoke the use of one another (Annett, 1993; Paivio, 1971, 1986). Consequently, it may be possible that additive performance effects were not found with the use of the strategies together as the participants were already using self-talk during the imagery phase of the intervention, without being aware of it.

6.4.3 Conclusion

To conclude, although the performance effects associated with the use of imagery in isolation, and with self-talk, were limited, all of the participants perceived their performance to be most improved when they used the strategies together. Therefore although the use of the strategies did not result in any performance improvements *per se*, the experience of playing golf may have been more pleasant for them as they expected to perform better.

The results from the current study were explained from two perspectives. Firstly, it was considered that the performance variability and the difficulties associated with collecting competition data made it difficult to determine 'true' performance effects. Secondly, it was suggested that the intervention, developed on the basis of golfers' practice of the strategies, failed to improve performance because golfers were naturally using the strategies ineffectively. If the latter conclusion is true, it has implications the development of future imagery and self-talk interventions.

7. General Discussion

7.1 General discussion

The purpose of this concluding chapter is to provide a synopsis of the aims of the programme of research and the four studies undertaken. Additionally, it will appraise the theoretical and practical outcomes of the research, the methodological issues encountered, and provide recommendations for future avenues of research. The main aim of this thesis was to identify the factors influencing the use and effectiveness of imagery and self-talk in golf. Before discussing the aims and outcomes of each study, however, it is important to revisit why this avenue of research was necessary.

At the commencement of the programme of research, recommendations for the usage of imagery and self-talk were ambiguous. Imagery and self-talk are hugely popular (Holmes & Collins, 2001; Short *et al.*, 2002; Theodorakis *et al.*, 2000; Zervas *et al.*, 2007; Zinsser *et al.*, 2010), functionally similar (Hardy *et al.*, 2001a) and theoretically connected psychological strategies (Annett, 1996; Paivio, 1971, 1986). In accordance with the multi-strategy approach to psychological skills training, the similarities and connections between imagery and self-talk led to calls for their combined use (Cumming *et al.*, 2006; Hardy *et al.*, 2001a). Although intuitively appealing, these recommendations were premature for several reasons. Firstly, there were only two experimental studies supporting the combined use of imagery and self-talk (Cumming *et al.*, 2006; Hall *et al.*, 1997). Moreover, there was limited understanding as to how imagery and self-talk were 'best used' independently of one another. Finally, there had been suggestions that individual differences, functional requirements and contextual factors could lead to athletes displaying preferences for the use of one strategy over the other.

In order to address the ambiguity regarding the usage of imagery and self-talk, four related studies in golf were designed and undertaken. There were two reasons for examining the factors affecting the use and effectiveness of imagery and self-talk in golf specifically. Firstly, golfers place great emphasis on the psychological aspects of performance (Rotella & Boutcher, 1990) and as a consequence widely report the use of psychological strategies (Bois *et al.*, 2009; Giacobbi *et al.*, 2005; Nicholls *et al.*, 2005a). Secondly, it has been suggested that approaches to sport psychology should be sport specific (Dosil, 2006).

The first three studies profiled golfers' existing practice of imagery and self-talk, identifying the predominant factors influencing the use of the strategies. Consequently, the first three studies sought to:

- Identify how preferred cognitive style impacted upon golfers' use of imagery and self-talk in practice and competition.
- Determine how imagery and self-talk were used in combination and isolation in golf considering the influence of contextual factors and functional requirements.
- Understand the nature of the competitive situations where golfers applied the use of imagery and self-talk.
- Determine how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediate preparation to execute, golf strokes under stressful conditions.

Once the predominant factors influencing golfers' usage of imagery and self-talk, in combination and isolation, had been identified an intervention that considered these, was developed and tested for effectiveness. Consequently, the aim of the final study was to:

- Determine the effectiveness of imagery and self-talk in facilitating the effective production of golf strokes under stressful conditions.

Upon addressing the overall aims of this thesis it is now important to consider the objectives and outcomes of each study in turn. Study one sought to identify any impact that preferred cognitive style had on golfers' use of imagery and self-talk. Preferred cognitive style refers to the preferences that people have for visual and verbal processing. It has been suggested that visually dominant people may be more likely to use imagery, whereas verbally dominant people may be more likely to adopt the use of self-talk (Hardy *et al*., 2010; Martin *et al*., 1999). As a result of these suggestions, it was important to determine the impact that golfers' preferred cognitive styles had on their usage of imagery and self-talk in practice and competition. Study one therefore addressed this research question. Results provided little support for preferred cognitive style as a determinant of golfers' preferences for the use of imagery or self-talk. Instead, all golfers reported the use of the strategies in equal proportion, with golfers with a preference for both visual and verbal processing using the strategies more than those with a preference for one or neither processing style. More importantly, results found that situational demands were a more powerful determinant of imagery and self-talk usage, with golfers making more use of the strategies in competition than practice. Consequently, it was concluded that the demands associated with competition override golfers' preferences for the use of imagery and self-talk, as they perceive the nature of the situation warrants the use of both strategies. These findings were supportive of the independent models of imagery (Fournier *et al*., 2008; Martin *et al*., 1999) and self-talk (Hardy *et al*., 2010) that have presented situational demands as a primary determinant of how the strategies are used.

Whilst results from study one revealed that golfers used imagery and self-talk in equal proportion, with more being made of their use in competition than practice, they failed to provide any insight into the interplay between the strategies. The second study was therefore designed to determine how golfers used imagery and self-talk in combination and isolation. More specifically, this study considered the role that functional requirements and contextual factors played in the use of the strategies as these have both been considered in the extant literature as potential determinants of the combined and independent use of imagery and self-talk (Fletcher & Hanton, 2001; Hall *et al*., 1997; Hardy *et al*., 2005a).

Findings supported those from study one in that golfers used imagery and self-talk more in competition than practice. Moreover, rather than employing imagery and self-talk continuously throughout competition, golfers in the main were found to employ the strategies more in certain contexts. There was considerable individual variation in the nature of the contexts where the golfers applied the use of the strategies. For example, golfers reported using the strategies, both independently and in combination, prior to the execution of tee shots, and in particular the first tee shot, putts, difficult shots and shots played onto the green. Additionally, the use of the strategies was further emphasised at the beginning and end of a round and when playing badly.

Upon ascertaining that golfers emphasised the use of imagery and self-talk in response to specific competitive situations, further analyses revealed that these contextual factors influenced golfers' preferences for the functions served by imagery and self-talk and their content. For example, when in the vicinity of the golf ball, prior to the execution of the golf strokes discussed, golfers reported using imagery and self-talk to externally imagine a variety of different shot options. Self-talk was used to supplement the imagined shots by both reaffirming and correcting them. This was in accordance with existing recommendations (Cumming *et al.*, 2006; Kendall *et al.*, 1990). The use of the strategies in this way was perceived as not only facilitating the planning of shots, but also exerting control over the golfers' emotional state. In contrast, when walking between shots golfers reported the use of self-talk predominantly, to either interrupt negative images and thoughts, or maintain motivation. The underpinning reason for the use of self-talk over imagery was that the golfers found the walking period potentially anxiety inducing, and preferred the use of self-talk as they found it difficult to control images.

These findings were of both theoretical and practical importance. From a theoretical perspective findings supported an extension of the model of imagery presented by Fournier *et al*. (2008) to include self-talk. In its current form this model presents contextual factors as the primary determinant of the functions served by imagery, which in turn influence the content and characteristics of the images. Evidence for an extension of this model to include self-talk is proposed as golfers' reported a strong preference for controlling emotions with the use of self-talk between shots that directly tackled these emotions e.g., 'relax.' In contrast, the golfers emphasised the use of imagery, supplemented with self-talk, during the pre-shot routine to plan shot options. It was concluded that golfers preferred controlling cognitive anxiety with self-talk, rather than imagery, because it worked in directly combating the negative verbalisations with which it is associated (Fletcher & Hanton, 2001), and was a quicker and easier strategy than imagery for serving this function (Hardy *et al.*, 2005a). In contrast, preferences for the use of imagery, supplemented with self-talk, for planning shots just prior to their execution was attributed to the theoretical connections between the strategies presented in the dual coding theory (Paivio, 1986). This theory suggests that when serving evaluative functions, such as the execution of shots, verbal cues can be used to manipulate images thus improving their quality. As a result of these findings figure 7.1 presents an extension of Fournier *et al "s* model of imagery to incorporate self-talk. This model of imagery and self-talk use considers situational demands and functional requirements as the primary determinant of athletes' preferences for the use of the strategies independently and in combination. Moreover, once the strategy of choice has been selected they are then represented in the most appropriate form to address the required function.

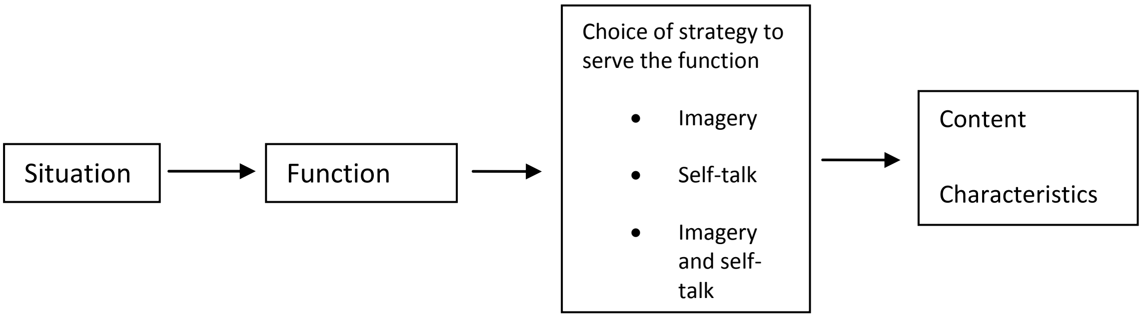


Figure 7.1: A model of imagery and self-talk use

In addition to the proposal of a new theoretical model of imagery and self-talk use, a number of practical considerations emerged from study two. For example, when golfers reported using imagery and self-talk to plan how to play golf strokes they reported imagining and talking themselves through a range of shot options rather than just one set outcome. This contrasts with the majority of imagery and self-talk interventions used in the past that have typically instructed athletes to either imagine or talk themselves through just one outcome (Cumming *et al.*, 2006; Nicholls *et al*., 2005c; Van Raalte *et al.*, 1995). Consequently, there could be implications for the way in which imagery and self-talk interventions are delivered in the future. Whilst the imagination of a variety of different shot options is at odds with the training approaches currently adopted in the literature, support for the use of the strategies in this way can be found by consulting the dual coding theory (Paivio, 1986).

Additionally, in contrast with the existing recommendations that imagery and self-talk should be used as part of a routine prior to the execution of every golf stroke (Boutcher & Rotella, 1987; Cohn *et al*., 1990), golfers reported emphasising the use of the strategies only in certain contexts during competition e.g., the first tee. Moreover, there was considerable individual variation in the nature of the shots when they emphasised their usage. This once again could have implications for how golfers should use imagery and self-talk but also raised an important question. Were there any shared features associated with the situations where golfers emphasised the use of the strategies? This understanding was required to provide an indication as to the function or task demands that they were being used to serve. Part A of study three sought to address this question and findings were used to inform the development of a questionnaire that would examine the relationships between the context, functions and preferences for different forms of imagery and self-talk.

Findings from part A of study three indicated that golfers employed imagery and self-talk more actively when they were playing golf strokes that they perceived to be stressful. The perceptions of stress associated with the golf strokes was found to emanate from either the golf stroke itself (i.e., it was a golf stroke that they typically found difficult), or from the situation that the golf stroke was being executed under (i.e., end of a round pressure mounts impacting on the execution of the following shot). Examples of golf strokes under stressful conditions included difficult shots, the first tee shots, putting and playing shots after making mistakes. Different golfers demonstrated different perceptions of which shots were stressful, although all were in accordance with the properties of stressful situations proposed by Lazarus and Folkman (1984). Finally, when presented with these situations golfers reported using either one, or both of the strategies, during the walk towards and just prior to the execution of the golf stroke.

Findings that the golfers more actively employed imagery and self-talk when playing golf strokes under stressful conditions appeared to suggest that they were using them as coping strategies. This conclusion was supported by the transactional theory of stress and coping, which suggests that the appraisal of a situation as stressful is often accompanied by a secondary appraisal whereby one asks themselves how they can cope with the situation (Lazarus & Folkman, 1984). Moreover, the theory suggests that people rarely employ strategies when they are presented with non-stressful situations as there is no need for their use (Folkman & Lazarus, 1985). To add further support to the golfers' use of imagery and self-talk as coping strategies, existing literature suggests that peak golfing performance is associated with an autonomous state (Cohn, 1991; Crews & Landers, 1993; Gallwey, 1979; Hellström, 2009; McCaffrey & Orlick, 1989). However, the experience of stress can disrupt this autonomous state (Crews, 2001). As such, it was concluded that imagery and self-talk usage was a function of the experience of stress as golfers actively made more use of the strategies in these situations.

Owing to the findings from part A of study three revealing that golfers emphasised the use of imagery and self-talk as coping strategies in stressful competitive situations, the purpose of part B of study three was to determine how they used them. Specifically, the study sought to identify how golfers used imagery and self-talk as problem and emotion focussed coping strategies during the walk towards, and immediately prior to, the execution of golf strokes under stressful competitive situations. The temporal patterning of the strategies was examined as previous research has suggested that coping can change over time (Gaudreau *et al.*, 2001). Moreover, because findings from study two indicated that golfers had a preference for coping with emotions with the use of self-talk, and predominantly used imagery to facilitate the execution of golf strokes, differences in the representation of imagery and self-talk as problem and emotion focussed coping strategies were examined. Finally, skill level differences in the use of imagery and self-talk as coping strategies was examined to provide an indication of the most effective representation of the strategies. In summation this study sought to add further support to the model of imagery and self-talk presented in figure 7.1. It did this by considering the influence of both contextual factors (proximity to the golf strokes under stressful conditions) and functional requirements (problem and emotion focussed coping) on golfers' use of imagery and self-talk.

Findings revealed that golfers used both imagery and self-talk more as problem focussed coping strategies during both the walk towards, and immediately prior to the execution of golf strokes under stressful conditions. Moreover, golfers were found to make more use of imagery than self-talk as a problem focussed coping strategy. This indicated that golfers adopted a strategic approach to managing stressors rather than controlling their emotions, directly contrasting existing recommendations that imagery and self-talk should be used as emotion focussed coping strategies (Jones, 2003; Tenenbaum *et al.*, 2008). In accordance with the transactional theory of stress and coping (Lazarus & Folkman, 1984) it was concluded that golfers demonstrated preferences for the use of imagery and self-talk as problem focussed coping strategies, rather than emotion focussed coping strategies, because they perceived golf strokes under stressful conditions to be controllable and challenging rather than uncontrollable and threatening. Additionally, it was suggested that imagery was the preferred form of representation for problem focussed coping because it had greater estimative qualities than self-talk. However, in accordance with the dual coding theory (Paivio, 1986) it was proposed that self-talk could be used as a secondary strategy to aid the manipulation of images where appropriate.

A final finding of interest was that skill level differences in the usage of imagery and self-talk as coping strategies were not found. This raised question marks over their effectiveness when used as problem focussed coping strategies. However, before reaching this conclusion it was proposed that the handicapping system in golf may have played a part in the lack of differences observed.

To conclude, results from part B of study three provided partial support for the model of imagery and self-talk proposed in figure 7.1. For example, findings supported the suggestion that the function of problem focussed coping led to a preference for the use of imagery over self-talk, because it had more relevant qualities necessary for the planning process. Evidence to support the role of contextual factors in the development of preferences for the use of imagery and self-talk was not found, although it was suggested that this may have been because the two contexts in the purpose designed questionnaire were not sufficiently distinct. Given the conflicting results further research is warranted to test the model of imagery and self-talk proposed within this thesis.

Although findings from part B of study three revealed that golfers had strong preferences for the use of imagery and self-talk as problem focussed coping strategies when playing golf strokes under stressful conditions, there was no indication of their effectiveness when used in this way. Further examination was therefore required to determine the effectiveness of imagery and self-talk as problem focussed coping strategies, because coping is only a person's 'efforts' to manage a situation and may therefore be ineffective (Nicholls *et al*., 2005c). The purpose of the final study was therefore to determine the effectiveness of imagery and self-talk as problem focussed coping strategies when playing golf strokes under stressful conditions. Additionally, because findings from part B of study three revealed that golfers made more use of imagery over self-talk, the study also sought to identify whether there were additive effects associated with the use of imagery and self-talk together compared to when only imagery was used.

In order to answer the research question in an ecologically valid setting a single-subject multiple baseline across individuals design was employed. Golfers from part B of study three, who had reported minimal usage of imagery and self-talk for planning golf strokes, were recruited for this study. The imagery and self-talk interventions focussed on equipping golfers with problem focussed planning skills for playing golf strokes under stressful competitive conditions.

Findings from the fourth study were equivocal. Golfers reported subjectively feeling as though their performance of golf strokes under stressful conditions had improved with the use of imagery and self-talk together. Despite this, improvements in objective performance measures were minimal with the use of both imagery, and imagery with self-talk. Only partial evidence was found for the use of the strategies in improving golfers' successful execution of golf strokes under stressful conditions. However, improvements were not observed across any other objective performance measures recorded. These included gross competition scores, percentage of fairways and greens hit in regulation and number of putts.

The mis-match between the perceived effectiveness of the strategies, and the limited actual performance effects observed were explained from a number of perspectives. Firstly, it was suggested that golfers had not completed enough competitions to successfully embed the use of the intervention into their routine to enable performance improvements to be observed. It has been suggested that golfers may require an extended period of time to experience the benefits of a new intervention (Cohn *et al*., 1990). Therefore, although the golfers perceived the strategies to be effective there may not have been enough time for these improvements to be observed. Additionally, it was proposed that the natural performance variability associated with golf performance may have made it difficult to determine the improvements associated with the intervention. Finally, and most importantly to future research, it was suggested that performance effects were not observed with the use of imagery and self-talk as problem focussed coping strategies simply because they were ineffective when used this way. The intervention applied was designed based on how golfers made use of the strategies in the formative studies. Consequently, it was suggested that although golfers may perceive the strategies to be effective when used in this way, this may be no more than a placebo effect. This has consequences for future research as interventions are often formulated on the basis of profiling existing practice.

Whilst it is controversial to suggest that athletes' usage of imagery and self-talk may serve as no more than a placebo effect, it is an avenue of research that warrants further attention. However, although the conclusions drawn from this thesis appear to suggest that the factors influencing golfers' usage of imagery and self-talk cannot be used as an indication of their effectiveness, the findings from the first three studies are not redundant. For example, coaches and golfers alike may now be more aware of the factors that shape golfers' usage of the strategies. Furthermore, future research may look to determine how golfers should potentially readdress their use of the strategies in these situations.

7.2 Recommendations for future research

Findings from this thesis revealed that golfers' usage, and preferences for imagery and self-talk were influenced by a variety of contextual factors and functional requirements. Moreover, results revealed that when an imagery and self-talk intervention, developed in consideration of these contextual factors, was employed no performance improvements were found. Although these findings were insightful there are several avenues for future research that warrant attention. These considerations are presented as three strands. One strand pertains to developing understanding of the relationship between the usage and effectiveness of imagery and self-talk. The second strand relates to developing 'best use' imagery and self-talk guidelines for golfers. The final strand pertains to the development of future research testing the model of imagery and self-talk presented in figure 7.1.

A key finding from this thesis was that there was an apparent lack of concordance between golfers' usage of imagery and self-talk and their actual effectiveness. Although the lack of concordance between imagery and self-talk usage and effectiveness found in the final study could have occurred as a result of a variety of external factors, it may have been due to the fact that golfers make ineffective usage of the strategies. Research has revealed that there is a positive relationship between the amount that athletes use imagery and its perceived effectiveness (Short *et al*., 2007; Weinberg *et al*., 2003). However, this is not sufficient given that findings from this thesis revealed a mis-match between what was perceived to be effective and the resultant performance outcome, thus indicating that golfers do not make the most effective use of imagery and self-talk. Research should therefore address this topic area. An example of such research could be to determine the performance effects associated with the usage of imagery and self-talk that is concordant with preferred processing styles. Although results from the first study revealed that preferred cognitive style was not a determinant of golfers' use of imagery and self-talk, findings from the studies in this thesis have revealed that this usage cannot be relied upon to develop effective interventions. Therefore, researchers may now seek to trial and test future interventions that may not be concordant with how golfers apply the strategies.

Along this similar avenue, it is evident from the formative studies that golfers value the usage of imagery and self-talk to manage golf strokes under stressful competitive conditions. Moreover, they report using the strategies either subconsciously or minimally when they are playing well or are challenged with 'straight forward' shots. Stress management is clearly important to golfers, however, researchers should look to develop more appropriate and effective imagery and self-talk stress management interventions. For example, the development of future imagery and self-talk stress management routines may seek to include an element of emotional control. Although golfers have demonstrated a preference for using imagery and self-talk as problem focussed coping strategies, Lazarus and Folkman (1984) suggested that emotion focussed strategies can be used as a precursor to the usage of problem focussed coping strategies, to ensure that unwanted emotions and thoughts are nullified before planning.

Furthermore, although there is limited support for the use of consistent pre-shot routines in the literature (Boutcher & Crews, 1987; Cohn *et al*., 1990), the use of consistent pre-shot imagery and self-talk routines may paradoxically improve stress management. For example, Mesagno, Marchant, and Morris (2008) found that a consistent pre-shot routine in bowling led to fewer experiences of choking. Therefore, future research may seek to ascertain the effectiveness of imagery and self-talk as part of a consistent pre-shot routine in stress management.

In addition to these intervention specific considerations future research should also look to develop a method for examining the effectiveness of interventions for golfers in ecologically valid settings. More specifically, a method that overcomes the issues associated with the natural performance variability and extraneous variables in golf performance requires development.

In addition to these considerations, future research is warranted to examine female golfers' use of imagery and self-talk in order to facilitate the development of future interventions. Extant research has demonstrated subtle differences between the male and female athletes in how they use the imagery (Weinberg *et al.*, 2003) and self-talk (Mahoney *et al.*, 1987). For example, research has revealed that female athletes use self-talk more than male athletes (Mahoney *et al*., 1987). In contrast, male athletes have been found to use CS, CG, MS and MG-M more than female athletes and perceive it to be more effective (Weinberg *et al*., 2003. These differences may influence the effectiveness of the strategies.

A final strand of future research should look to test the model of imagery and self-talk use presented in figure 7.1. Findings from this thesis have shown that recommendations for the combined use of imagery and self-talk are not as straight forward as originally proposed (Hardy *et al*., 2001a). Instead, findings revealed that golfers demonstrate preferences for the independent and combined use of imagery and self-talk use depending on contextual factors and functional requirements. As such further research should seek to ascertain athlete preferences for the use of imagery and self-talk, independently and in combination, in different situations and when different functional requirements need serving. This research should then look to identify patterns in the content of the images and self-talk when serving these functions. Once patterns of usage have been identified in consideration of these factors they should be tested for their effectiveness.

7.3 Conclusion

To conclude, findings from this thesis suggest that golfers' use of imagery and self-talk, in combination and isolation, is determined by contextual factors and functional requirements. These findings have resulted in the development of a model to explain golfers' use of imagery and self-talk (see figure 7.1). In contrast with existing models of imagery (Martin *et al*., 1999) and self-talk (Hardy *et al*., 2010), that consider the functions of the strategies as outcomes, the model proposed in this thesis presents them as determinants of athletes' preferences for the way in which the strategies are used.

The development of this theoretical model has practical relevance for coaches, golf professionals, sport psychologists and researchers. For example, there is now greater understanding of the contexts and functional requirements that invoke golfers' use of imagery and self-talk. To illustrate this, findings from this thesis revealed that the presentation of stressful golf strokes led to the use of imagery and self-talk as problem focussed coping strategies, with more being made of imagery than self-talk in serving this function. When using imagery and self-talk in this way golfers were found to use self-talk as a secondary strategy to invoke and manipulate images. Moreover, golfers reported imagining a range of shot options when planning golf strokes. These findings are of importance for several reasons. Firstly, the notion that golfers only used imagery and self-talk when playing stressful golf strokes, and imagined a range of shot options, directly contrasts with existing recommendations for their use which suggest that they should be employed prior to the execution of every shot (Boutcher & Rotella, 1987). This is of practical importance as it appears that golfers use imagery and self-talk only when they require them to manage more difficult or stressful shots. Moreover, it might be possible that the active usage of the strategies when playing well may be perceived as disruptive to the autonomous execution of golf strokes. Peak performance in golf is associated with the autonomous and unconscious execution of skills (Cohn, 1991; Crews & Landers, 1993; Gallwey, 1979; Hellström, 2009; McCaffrey & Orlick, 1989). As such it appears possible that the use of imagery and self-talk as performance enhancement methods are only required when this autonomous state has been disrupted by the presentation of stress. As a result, it is suggested that recommendations for golfers' use of imagery and self-talk prior to the execution of golf strokes may need to be reconsidered.

A further implication for the future practice of imagery and self-talk pertains to the way in which scripts for their usage are employed. Typically imagery and self-talk scripts contain set response outcomes which can be rehearsed prior to a task or scenario (Cumming *et al.*, 2006; Short *et al.*, 2002; Taylor & Shaw., 2002; Nicholls *et al*., 2005c). However, findings from this thesis provide opposition to this approach, as golfers were found to imagine and talk themselves through a variety of shot options in order to make the best judgement about how to play them. As such, coaches, sport psychologists and golf professionals may now have to consider allowing players to create images of a range of different shot options when using the strategies.

Understanding of golfers' preferences for the use of imagery and self-talk is of importance as Hall *et al*. (1990) previously argued that athletes are more likely to use psychological strategies that they feel comfortable with. Moreover, there is a relationship between the frequency with which athletes use psychological strategies and how effective they perceive them to be (Short *et al*., 2007; Weinberg *et al*., 2003). As such, if golfers feel comfortable using the imagery and self-talk in a particular way, the experience of playing golf might be more pleasant than when they are recommended the use of strategies that they are less comfortable with.

Although recommendations for the use of imagery and self-talk as problem focussed coping strategies prior to the execution of stressful golf strokes is of intuitive appeal, only partial support for their effectiveness was found. This does provide some indication that coaches, golf professionals and sport psychologists should adopt a degree of caution when recommending the use of interventions based on ‘usage’ studies, as athletes may be inherently using the strategies in an ineffective way. However, before this caution is applied the issues associated with performance variability and extraneous variables encountered in the final study need to be addressed to more successfully determine the effectiveness of imagery and self-talk. Moreover, it is important to recognise that there is a large body of ‘usage’ studies supporting the development of successful interventions (Bernier & Fournier, 2008; Hardy *et al*., 2005a; Hardy *et al*., 2004; Munroe *et al*., 2000).

In conclusion, findings from this thesis have shown that it is not as straight forward as to suggest that imagery and self-talk should always be used together. Golfers have been found to demonstrate preferences for the combined and independent use of imagery and self-talk depending on contextual factors and functional requirements. Typically, the presentation of stressful shots invokes golfers’ use of imagery and self-talk as problem focussed coping strategies. However, further research is warranted to determine the effectiveness of the imagery and self-talk when used in this way.

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Appendices

Style of Processing Scale (SOP)

Instructions: The aim of this exercise is to determine the style or manner you use when carrying out different mental tasks. Your answers to the questions should reflect the manner in which you typically engage in each of the tasks mentioned. There are no right or wrong answers, we only ask that you provide honest and accurate answers. Please answer by circling one of the four possible responses. For example if I provided the statement "I seldom read books," and this was your typical behaviour, even though you might read say one book a year you would circle the "ALWAYS TRUE" response.

Item	Response			
	ALWAYS TRUE	USUALLY TRUE	USUALLY FALSE	ALWAYS FALSE
1. I enjoy doing work that requires the use of words	1	2	3	4
2. There are some special times in my life that I like to relive by mentally "picturing" just how everything looked.	1	2	3	4
3. I can never seem to find the right word when I need it.	1	2	3	4
4. I do a lot of reading	1	2	3	4
5. When I'm trying to learn something new, I'd rather watch a demonstration than read how to do it	1	2	3	4
6. I think I often use words in the wrong way.	1	2	3	4
7. I enjoy learning new words	1	2	3	4
8. I like to picture how I could fix up my apartment or room if I could buy anything I wanted.	1	2	3	4
9. I often make written notes to myself.	1	2	3	4
10. I like to daydream.	1	2	3	4
11. I generally prefer to use a diagram rather than a written set of instructions.	1	2	3	4
12. I like to doodle.	1	2	3	4
13. I find it helps to think in terms of mental pictures when doing many things.	1	2	3	4
14. After I meet someone for the first time, I can usually remember what they look like, but not much about them	1	2	3	4
15. I like to think of synonyms for words.	1	2	3	4
16. When I have forgotten something I frequently try to form a mental "picture" to remember it.	1	2	3	4
17. I like learning new words.	1	2	3	4
18. I prefer to read instructions about how to do something rather than have someone show me	1	2	3	4
19. I prefer activities that don't require a lot of reading	1	2	3	4
20. I seldom daydream	1	2	3	4
21. I spend very little time attempting to increase my vocabulary.	1	2	3	4
22. My thinking often consists of mental "pictures" or images.	1	2	3	4

Test of Performance Strategies (TOPS) - Please rate how frequently each item below applies to you in golf competition.

Competitive setting	Never	Rarely	Sometimes	Often	Always
Self - Talk					
I talk positively to get the most out of competitions	1	2	3	4	5
I say things to help competitive performance	1	2	3	4	5
I manage self talk effectively	1	2	3	4	5
I say specific cue words or phrases to help performance	1	2	3	4	5
Imagery					
I imagine a competitive routine before I do it	1	2	3	4	5
I rehearse the feel of performance in my imagination	1	2	3	4	5
I rehearse my performance in my mind	1	2	3	4	5
I visualise competition going exactly the way I want it	1	2	3	4	5

Practice setting - Please rate how frequently each item below applies to you in golf practice.

Self – Talk					
I talk positively to get the most out of practice	1	2	3	4	5
I motivate myself to train through positive self talk	1	2	3	4	5
I say things to myself to help my practice performance	1	2	3	4	5
I manage my self talk effectively	1	2	3	4	5
Imagery					
When I visualise my performance, I imagine watching myself as if on a video	1	2	3	4	5
I visualise successful past performances	1	2	3	4	5
I rehearse my performance in my mind	1	2	3	4	5
When I visualise my performance, I imagine what it will feel like	1	2	3	4	5

northumbria UNIVERSITY
School of Life Sciences

INFORMED CONSENT FORM

Project Title: ________________________________

Principal Investigator: ________________________________

Participant Number: ______

	please tick where applicable
I have read and understood the Participant Information Sheet.	☐
I have had an opportunity to ask questions and discuss this study and I have received satisfactory answers.	☐
I understand I am free to withdraw from the study at any time, without having to give a reason for withdrawing, and without prejudice.	☐
I agree to take part in this study.	☐
I would like to receive feedback on the overall results of the study at the email address given below. I understand that I will not receive individual feedback on my own performance. Email address…………………………………………………………………	☐

Signature of participant…………………………………………… Date……………………

(NAME IN BLOCK LETTERS)…………………………………………………………………

Signature of Parent / Guardian in the case of a minor

……………………………………………………………………………

Signature of researcher…………………………………………… Date……………………

(NAME IN BLOCK LETTERS)…………………………………………………………………

SCHOOL OF PSYCHOLOGY & SPORT SCIENCES.

PARTICIPANT INFORMATION.

PROJECT DETAILS

TITLE OF PROJECT: Golf players' preferred cognitive style and their use, and preference for use, of imagery and self talk in practice and competition.

Participant ID Number:

Principal Investigator: Fran Longstaff

Investigator contact details: **Phone:** 0191 227 3717

Email: fran.longstaff@unn.ac.uk

This project is funded by: N/A

Number of participant points / payment: N/A

INFORMATION TO POTENTIAL PARTICIPANTS
1. What is the purpose of the project? Many golf players report the use of imagery and self talk in competition and practice. **Self talk** is defined as the dialogue that you have with yourself. It can either be out loud or you may talk to yourself in your mind, so that only you can hear what you are saying. You may say things to get yourself psyched up or calmed down, to stay focussed, or keep going, etc. **Imagery** commonly referred to as visualisation involves a person mentally viewing or experiencing themselves performing a task. The purpose of the present study is to examine how individual differences in preferred

cognitive style impact upon golfers' imagery and self talk use in practice and competition. Preferred cognitive style refers to the different ways in which individuals prefer to receive, process and respond to information. For example some people have a strong preference for receiving, processing and responding to verbal information (verbalisers) whereas others are more visually orientated (visualisers).

2. Why have I been selected to take part?

You are a male competitive golf player who has played in one or more competitions this year.

3. What will I have to do?

If you wish to partake you will firstly be asked to sign an informed consent document. Upon completion of this document you will then be asked to fill in four short questionnaires. Completion of the questionnaire pack will take approximately 10 minutes.

4. What are the exclusion criteria (i.e. are there any reasons why I should not take part)?

You must be a male competitive golf player who has played in one or more competitions this year.

5. Will my participation involve any physical discomfort?

No

6. Will my participation involve any psychological discomfort or embarrassment?

No

7. Will I have to provide any bodily samples (i.e. blood, saliva)?

No

8. How will confidentiality be assured?

You will be given a participant ID number and this will be used to identify the data that you provide. All consent forms and demographic information will be stored separately and securely from one another and the anonymous questionnaire responses that you provide.

9. Who will have access to the information that I provide?

Only the Principal investigator will have access to the raw data that you provide.

10. How will my information be stored / used in the future?

Your consent form and any personally identifying information will be stored separately from one another and your anonymous questionnaire response in locked secure cabinets. The data will be presented as part of a PhD thesis and published in scientific journals and/or presented at scientific conferences. In these circumstances your name will not appear in any of the study write up.

11. Has this investigation received appropriate ethical clearance?

Yes

12. Will I receive any financial rewards / travel expenses for taking part?

No

13. How can I withdraw from the project?

You are free to withdraw from the study at any time and your data will be destroyed. If you wish to do this contact the principle researchers using the contact details presented on the debrief document or below.

14. If I require further information who should I contact and how?

Please contact the Principal investigator using the contact details provided.

SCHOOL OF PSYCHOLOGY & SPORT SCIENCES.

PARTICIPANT DEBRIEF

TITLE OF PROJECT: Golf players' preferred cognitive style and their use, and preference for use, of imagery and self talk in practice and competition.

Participant ID number:

Principal Investigator: Fran Longstaff

Investigator contact details: **Phone:** 0191 227 3717

Email: fran.longstaff@unn.ac.uk

1. What was the purpose of the project?

Many golf players report the use of imagery and self talk in competition and practice. **Self talk** is defined as the dialogue that you have with yourself. It can either be out loud or you may talk to yourself in your mind, so that only you can hear what you are saying. You may say things to get yourself psyched up or calmed down, to stay focussed, or keep going, etc. **Imagery** commonly referred to as visualisation involves a person mentally viewing or experiencing themselves performing a task.

The purpose of the study was to examine how individual differences in preferred cognitive style impacted upon golfers' imagery and self talk use in practice and competition. Preferred cognitive style refers to the different ways in which individuals prefer to receive, process and respond to information. For example some people have a strong preference for receiving, processing and responding to verbal information (verbalisers) whereas others are more visually orientated (visualisers).

2. How will I find out about the results?

If you wish to find out about the general results of this investigations contact the Principal investigator using the contact details provided above.

3. Will I receive any individual feedback

You will not receive individual feedback but you can contact the principle investigator regarding the general results of the project.

4. What will happen to the information I have provided?

Your consent form and any personally identifying information will be stored separately from one another and your anonymous questionnaire responses in locked secure cabinets.

5. How will the results be disseminated?

The data will be presented as part of a PhD thesis and published in scientific journals and/or presented at scientific conferences. In these circumstances your name will not appear in any of the study write up.

6. Have I been deceived in any way during the project?

No

7. If I change my mind and wish to withdraw the information I have provided, how do I do this?

You are free to withdraw from the study at any time and your data will be destroyed. If you wish to do this contact the principal researcher using the contact details at the top of this document.

If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks of taking part, then please contact Professor Kenny Coventry via email at kenny.coventry@unn.ac.uk, or via telephone on 0191 2437027.

Tests of Within-Subjects Contrasts

Measure:MEASURE_1

Source		ps	Type III Sum of Squares	df	Mean Square	F	Sig.
Cond	Linear		6.001	1	6.001	24.215	.000
cond * handicap	Linear		.366	1	.366	1.479	.226
cond * PCS	Linear		2.731	3	.910	3.674	.013
Error(cond)	Linear		44.858	181	.248		
Ps		Linear	.243	1	.243	.585	.445
ps * handicap		Linear	.007	1	.007	.017	.897
ps * PCS		Linear	.485	3	.162	.389	.761
Error(ps)		Linear	75.266	181	.416		
cond * ps	Linear	Linear	.493	1	.493	2.361	.126
cond * ps * handicap	Linear	Linear	.909	1	.909	4.354	.038
cond * ps * PCS	Linear	Linear	.768	3	.256	1.227	.301
Error(cond*ps)	Linear	Linear	37.778	181	.209		

Information for participants

What is the purpose of this project?

Golf is a mentally challenging sport and players frequently employ mental strategies such as imagery and self talk to help facilitate their psychological state. **Self-talk** is defined as the dialogue that you have with yourself. It can either be out loud or you may talk to yourself in your mind, so that only you can hear what you are saying. You may say things to get yourself psyched up or calmed down, to stay focussed, or “keep going”, etc. **Imagery**, commonly referred to as visualisation, involves a person mentally viewing themselves performing a task. It has been suggested that imagery and self talk can serve both cognitive and motivational functions e.g. they can either be used to help us learn/cement certain strategies or skills or they can be used to help optimum psychological states be attained e.g. increased confidence and motivation and reduced anxiety etc.

Many researchers have called for the use of combined imagery and self talk, despite little research being conducted on the effectiveness of such combinations. In opposition some researchers argue that individual athlete differences in preferred cognitive style (habitual mode of processing) should be considered when delivering imagery and self talk training. As such they argue for independent intervention strategies because some athletes may respond better to verbal information whereas other may prefer visual information; the combination of strategies may therefore limit their effectiveness.

This is the second in a series of studies in this area. Study 1 examined the effect that golf players’ preferred cognitive style had on their preference/ use of imagery and self talk in practice and competition. Results revealed no effect for preferred cognitive style and that all players used relatively equal amounts of self talk and imagery. In addition it was found that more imagery and self talk was used in competition than practice.

The purpose of this study is to explore why golfers use both strategies, despite their preferred cognitive style, and whether those strategies are used in combination or isolation. In addition it is hoped that the study will generate further insight into the uses of imagery and self talk in practice vs competition by golfers and that practical implications can be gained in terms of how, when and why the two skills should be used in conjunction with one another and how, when and why it may be more effective to use them alone.

What do I have to do if I get involved in this study?

If you wish to participate in this study you will firstly be asked to sign an informed consent document. You will then be asked to take part in a short 30 – 45 minute interview which will focus on your self-talk and imagery use in specific practice and competition golf scenarios. The interview will be tape recorded but only I will have access to these tapes.

What will happen with the information that I give you?

The personal information that you give me will be stored in a secure unit where only I will have access to it. Your raw data such as interview transcripts and the recorded interviews may be viewed by other researchers however you will not be made personally identifiable. Your information will be kept confidential and anonymous. Your name will not appear in any of the written up investigation. Please note that your individual results will not be made available to you, the overall results from the study however will be made available from either myself or the Northumbria University's Sports Science Department.

Are there any reasons I should not take part?

You will not be put at any physical or mental risk or strain being involved in this study. It will only take approximately 30 - 45 minutes to complete the interview. You will not receive any specific benefits from being involved in this study.

What if I agree to take part and then I change my mind?

You are free to withdraw from the study at any time and your results will be withdrawn from the investigation. If you wish to withdraw your results from the study upon completing the interview you can contact the researcher by email or telephone and they will withdraw the results. These contact details will be made available on the debrief document that will be given to you at the end of the study.

Participant number:……….

Interview questions

Introduction

The purpose of this study is to examine your use of imagery and self-talk in practice and competition. This is a follow up from a study that examined the role of preferred cognitive style on imagery and self-talk use in practice and competition. Imagery/visualisation is defined a process that uses all the senses to create or re-create an experience in the mind without doing it. In contrast self-talk is classified as what people say to themselves either out loud or as a small voice inside their head. We will start by talking about your use of imagery, then self-talk and then discuss how both skills are used in conjunction.

Imagery

What

- Can you describe your experience of using imagery in golf?
  - Differences in practice – competition
  - Specific skills
- What sensations do you specifically experience?
  - What type of things do you see?
  - Perspective (internal, external)
  - Does your perspective change in different situations?
  - Sounds
  - Kinaesthetic
  - Touch
- How clear and controllable do you find these images?
  - Positive, negative, neutral
  - Planned
  - What about in different situations?
- Any verbalisations included

Where, when

- Where do you tend to use imagery most?
  - Practice – competition
  - Any specific places? Before, during, after practice – competition (provide specific examples)
  - Any specific skills?
- Do you find it more important to use imagery in certain situations? If so where? Anxious – learning skills?
  - In which situation do you feel you benefit most from using imagery?

Why

- Could you describe your use of imagery to rehearse or execute skills
  - provide specific examples
  - practice – competition
  - link to self-talk
- Could you describe your use of imagery to rehearse strategies or tactical play
  - practice – competition
  - provide specific examples
  - link to self-talk
- Could you describe your use of imagery to control arousal or stress
  - practice – competition
  - provide specific examples
  - psych up - relax
  - link to self-talk
- Could you describe your use of imagery to master a situation where you needed to be mentally tough, focus and increase confidence
  - practice – competition
  - provide specific examples
  - link to self-talk
- Could you describe when you used imagery to increase your drive or effort?
  - Practice – competition
  - Provide specific examples
  - Link to self-talk

- Which types of imagery do you think facilitate your performance and psychological state most?

Self-talk

What

- Can you describe the types of things that you say to yourself in golf?
  - practice – competition
  - positive, negative, neutral
  - task instruction
- Can you describe the nature of your self-talk?
  - overtness
  - person (1^{st} 3^{rd})
  - planned – situation dependent
  - cue words
  - sentences
  - phrases
- Do some verbalisations in certain situations easier to control than others?
  - competition – practice
- Any use of visualisation in addition to your self-talk use

Where, when

- Where do you tend to use self-talk most?
    - Practice – competition
    - Any specific places? Before, during, after practice – competition (provide specific examples)
    - Any specific skills?
- Do you find it more important to use self-talk in certain situations? If so where? Anxious – learning skills?
    - In which situation do you feel you benefit most from using self-talk?

Why

- Could you describe your use of self-talk to rehearse or execute skills
    - provide specific examples
    - practice – competition
    - link to imagery
- Could you describe your use of self-talk to rehearse strategies or tactical play
    - Practice – competition
    - Provide specific examples
    - Link to imagery
- Could you describe your use of self-talk to control arousal or stress
    - practice – competition
    - provide specific examples
    - psych up - relax
    - link to imagery
- Could you describe your use of self-talk to master a situation where you needed to be mentally tough, focussed and increase confidence
    - practice – competition
    - provide specific examples
    - link to imagery
- Could you describe when you used self-talk to increase your drive or effort?
    - Practice – competition
    - Provide specific examples
    - Link to imagery

- Which type of self-talk do you think facilitates your performance most?

Combined imagery and self-talk use

The purpose of this section, if it is applicable to you, is to gain some insight into how you combine the use of imagery and self-talk.

- Are there any scenarios in which you use both imagery and self-talk simultaneously? Could you describe your experience and the types of things that you visualised and verbalised?

- Can you describe any situations where you use combinations of imagery and self-talk to rehearse or execute skills
    - provide specific examples
    - practice – competition
    - When specifically do you use such methods (before, during, after)
    - positive, negative, neutral
    - task instruction
    - overtness
    - person (1^{st} 3^{rd})
    - planned – situation dependent
    - cue words
    - sentences
    - phrases
    - internal/ external
    - controllability

- Can you describe any situations where you use combinations of imagery and self-talk to rehearse strategies or tactical play
    - Practice – competition
    - When specifically do you use such methods (before, during, after)
    - Provide specific examples
    - positive, negative, neutral
    - task instruction
    - overtness
    - person (1^{st} 3^{rd})
    - planned – situation dependent
    - cue words
    - sentences
    - phrases
    - internal/ external
    - controllability

- Can you describe any situations where you use combinations of imagery and self-talk to control arousal or stress
    - practice – competition
    - When specifically do you use such methods (before, during, after)?
    - provide specific examples
    - psych up – relax
    - positive, negative, neutral
    - task instruction
    - overtness
    - person (1^{st} 3^{rd})
    - planned – situation dependent

- cue words
- sentences
- phrases
- internal/ external
- controllability

- Can you describe any situations where you used combinations of imagery and self-talk to master a situation where you needed to be mentally tough, focus and increase confidence
  - practice – competition
  - When specifically do you use such methods (before, during, after)?
  - provide specific examples
  - link to imagery
  - positive, negative, neutral
  - task instruction
  - overtness
  - person (1^{st} 3^{rd})
  - planned – situation dependent
  - cue words
  - sentences
  - phrases
  - internal/ external
  - controllability

- Can you describe any situations where you use combinations of imagery and self-talk to increase your drive or effort?
  - Practice – competition
  - When specifically do you use such methods (before, during, after)
  - Provide specific examples
  - link to imagery
  - positive, negative, neutral
  - task instruction
  - overtness
  - person (1^{st} 3^{rd})
  - planned – situation dependent
  - cue words
  - sentences
  - phrases
  - internal/ external
  - controllability

- Which combination do you feel facilitates your performance most?

Interview schedule – Follow up questions

Imagery/visualisation is defined a process that uses all the senses to create or re-create an experience in the mind without doing it. In contrast self-talk is classified as what people say to themselves either out loud or as a small voice inside their head.

Isolated imagery use

- What do you generally tend to imagine during a round of golf? Why this type?
  -Does this differ to what you imagine before and after?
- Do you ever imagine winning an event?
  -When does this happen? How does it make you feel? Does it happen on course of course?
- Do you ever imagine coping with pressure or your correct arousal? On course off course differences?
- Do you ever imagine feeling confident and focussed? Does this happen on course? Why?
  - What do you imagine on course in particular to make you feel confident? Control your arousal?
  - Does the imagination of skills increase your confidence specifically? Why? How does it make you feel? Is an element of self-talk included to help this occur?
  - Do ever imagine a golf course and your game plan? Expand?
  - Can imagining winning or dealing with pressure help the technical elements of your game?

- Does on course MG-M and MG-A happen?

  -Do you imagine winning whilst playing?

  -Does it help or hinder performance?

Isolated self-talk use

- Can talking to yourself to keep yourself motivated/help with the technical elements of your game?
- Can talking to yourself about the technical elements of the game help your confidence?

- Does on course MG-M self-talk ever occur e.g. telling yourself you're going to win an event? Expand.
- Does your self-talk differ on course to pre?
- During competition do you use self-talk to talk yourself through the technical aspects of the game or to control arousal or both?

Preference for one strategy over the other

- When you experience high pressure or arousal scenarios do you use both strategies together or are you more reliant on one strategy than the other? Expand? Types experienced?
- In order to increase during game confidence and concentration are you more reliant on one strategy than the other or do you use both? Is this different for before game confidence/concentration? Expand – what do you say imagine?
- When learning or executing a skill are you more reliant on one than the other? Or do you use both together? Is this always the same in practice and pre and during competition?

Combined imagery and self-talk use

- How does your imagery and self-talk inform one another?

  -How do the two techniques work together?

  -How do you combine the two, and why?

  -Examples

  -Does use of one strategy cause the other to happen? Expand.

- Do you use combined imagery and self-talk to increase your confidence?

  -what do you imagine/say to yourself?

  -Do you imagine feeling confident during competition? What self-talk happens?

  -How does this differ pre and during competition? Do you use the same type of imagery/self-talk to increase confidence during competition as you do pre?

  -Do you ever imagine your emotional state whilst playing and does this make you feel more confident?

- Does your imagery and self-talk happen simultaneously or does one cause the other to happen? Which usually happens first?

- Do you ever use imagery and self-talk together to serve different functions? For example can you be using one to help control your mental state and the other to facilitate the technical elements of the game?

- Does what you imagine/ say to yourself affect one another?

- Do you find it difficult to separate your imagery and self-talk use?

  -do they always happen together?

  -is it a conscious or unconscious process?

- Do you think self-talk alters how effective and clear your imagery is or how it makes you feel, e.g. confidence? Examples.

- Does self-talk add clarity to your imagery? Expand?

- Does imagery add clarity to your self-talk? Does this happen when you talk through what you are imagining?

- Pre shot routine? Does it include any of those listed above?

Debriefing document

Participant identification number:……………

Thank you for taking the time to be interviewed for this research project investigating golf players' use of imagery and self talk in practice and competition. Be assured that the data that you have provided will remain confidential and anonymous.

You have just taken part in the second of two studies. Study 1 examined the effect that golf players' preferred cognitive style had on their use of imagery and self talk in practice and competition. Preferred cognitive style is a person's habitual mode of representation; some people have a preference for visual information whereas others prefer verbal information. **Self talk** is defined as the dialogue that you have with yourself. It can either be out loud or you may talk to yourself in your mind, so that only you can hear what you are saying. You may say things to get yourself psyched up or calmed down, to stay focussed, or "keep going", etc. **Imagery**, commonly referred to as visualisation, involves a person mentally viewing themselves performing a task.

Results from study 1 revealed that, overall, golf players utilised relatively even amounts of imagery and self talk in practice and competition regardless of their preferred processing style, with use being significantly higher in competition than practice. A number of sport psychologists suggest that imagery and self talk should be used in combination, however this is with little academic support.

The purpose of this study was to examine golf players' use of imagery and self talk and to establish whether players use those strategies in combination or isolation. It was hoped that the study would generate further insight into the uses of imagery and self talk in practice vs competition by golfers so that implications could be established in terms of how, when and why the two skills should be used in conjunction with one another and how, when and why it may be more effective to use them alone.

If you have any questions regarding the study please feel free to contact the researcher either at fran.longstaff@unn.ac.uk or on 0191 227 3717. If you wish to withdraw your data from the investigation please contact the researcher and cite your participant number and your data will then be removed.

If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks after the study is concluded then please contact Professor Kenny Coventry via email at **kenny.coventry@unn.ac.uk**, or via telephone on 0191 2437027.

Self-talk refers to the dialogue that a person has with themselves either out loud or in their head. A person may provide themselves with instructions on how to perform a task or may provide themselves with motivational chatter. Imagery, often referred to as visualisation, refers to the creation or recreation of events or tasks in the mind without physically engaging in them. For example a golfer may imagine how to perform a certain golf stroke or winning a tournament.

- **Introductory questions**

  What handicap do you all play off?
  Where do you play?
  Competitive standard?

  When would you utilise imagery most during a competitive round of golf?

  When would you utilise self-talk most during a competitive round of golf?

- **Key situations prompts (only to be used if they do not raise these themselves)**

- **The 1st tee shot**
  - Could you describe what the first tee shot feels like?
  - What are the characteristics of the first tee shot?
  - Prompts (only to be used if lacking detail)
    - Important
    - Technically demanding
    - Stressful

  - When do you specifically use imagery and self-talk in these scenarios?

- **Every tee shot**
  - What do tee shots feel like?
  - What are the characteristics of the tee shot?
  - Is every tee shot as important as each another?
  - If not why?
  - Which tee shots would you use imagery and self-talk on and when would you use them here?
    - Important
    - Technically demanding
    - Stressful

  - When specifically on the tee shot would you use imagery and/or self-talk?

- **The first few holes of competition**
  - What do the first few holes of competition feel like?
  - What are the characteristics of the first few holes of competitions?
    - Important
    - Technically demanding

        - Stressful
    - When would you use imagery and self-talk here?
    - Differences/similarities between imagery and self-talk?
        - Tee shots
        - Iron shots
        - Between shots
        - Chip shots
        - Putting
        - Starting poorly
        - Starting well

- **Starting a competitive round of golf poorly**
- What constitutes starting a competitive round of golf poorly?
- What does it feel like?
- What does it feel like on the shot you were struggling with?
        - Tee shots
        - Iron shots
        - Between shots
        - Chip shots
        - Putting
        - Starting poorly
        - Starting well
- When would you use imagery and/or self-talk within this time frame? Specific detail.

- **Taking a difficult shot**
- What does it feel like?
- What constitutes a difficult shot?
    - Stressful
    - Important,
    - Technically demanding?
- Any consistently difficult shots?
    - Drive
    - Iron shots
    - Chip
    - Putt
- What difficult shots would you use imagery and/ or self-talk on?
- When specifically would you use the strategies?

- **Taking a putt**
- What are the key characteristics of putting?
- What does putting feel like?
    - Stressful
    - Important,
    - Technically demanding
- Is every putt as critical as each other? Detail?
    - Beginning end of the round, playing well, playing badly?
    - Birdie
    - Bogey

  - Par
- When specifically would you use imagery and self-talk and on which type of putts?

- **Pitched shots**
- What are the characteristics of a chip shot?
  - Stressful
  - Important
  - Technically difficult
- Is every chip shot important? Why? Detail?
- What type of chips would you use imagery and or self-talk on and when?
- When specifically would you use the strategies?

- **A bad spell of holes**
- How does it make you feel?
- What constitutes a bad spell of holes?
  - Stressful
  - Important
  - Technically demanding
  - Critical
- How many holes have to be bad before it is a bad spell?
- When specifically would you use imagery and or self-talk after a bad spell of holes?
- On which shots? Which time points?

- **Immediately after the production of a bad shot**
- How does it make you feel?
- What constitutes a bad shot?
  - Stressful
  - Important
  - Technically demanding
- Is this a critical time to performance?
- When specifically would you employ imagery and or self-talk?

- **Walking between shots**
- How does it make you feel?
- What are the features of this type of situation
  - Stressful
  - Important
  - Technically difficult
- Is this a critical part of your golf performance?
- When would you employ imagery and or self-talk? After a good shot bad shot/good shot? Similarities? Differences?

- **The last few holes of competition**
- Playing well/playing badly?
- How does it make you feel?
- What are the features of this type of situation?
  - Stressful
  - Important,
  - Technically demanding

- When is it particularly critical during this time frame? Highlight?
- Putting, drive, irons, chipping, walk between shots?
- When specifically would you employ imagery and or self-talk?

When is it most important to use imagery and self-talk?

PARTICIPANT INFORMATION.

TITLE OF PROJECT: The identification of specific situations during a competitive round of golf where golfers utilise imagery and/or self talk (Part 1).

Participant ID Number:

Principal Investigator: Fran Longstaff

Investigator contact details: Email: fran.longstaff@northumbria.ac.uk

This project is funded by: N/A

Number of participant points / payment: N/A

INFORMATION TO POTENTIAL PARTICIPANTS
1. What is the purpose of the project? A preceding investigation revealed that golfers utilise imagery and self talk to a greater extent in competition than practice. Furthermore the study revealed that golfers utilised imagery and/or self talk most in certain situations during a round of golf. Despite it being revealed that golfers utilised imagery and self talk to a greater extent in certain situations some detail was lacking regarding these situations. For example numerous golfers stated that they would ustilise either one, or both of the strategies to a great extent towards the beginning and end of competitive round but little was known about when within these time frames they were specifically employed. Imagery, often referred to as visualisation, is the creation or recreation of events of scenarios without physically performing them e.g. a golfer may imagine winning a tournament or performing a specific golf stroke. Self talk refers to the dialogue that a person has with themselves either outloud or in their head e.g. a golfer may provide themselves with

instructions or talk to themselves to motivate them.

The purpose of the study is to examine what the specific situations are within a competitive round of golf where golfers utilise imagery and/or self talk. In addition to this it is also important to identify what the common features of these situations are.

2. Why have I been selected to take part?

You have been selected to take part because you are a competitive male golfer over the age of 18 years old and have a handicap within the 0-5 range. You are also currently actively competing in competitions.

3. What will I have to do?

You will be asked to sign an informed consent document and take part in a focus group which will explore and identify the specific situations during a competitive round of golf where golfers employ the use of imagery and/or self talk and what the characteristics of these situations are. The information from the focus group will be tape recorded so that a clear record of what was discussed can be stored. The focus group will take approximately one hour.

4. What are the exclusion criteria (i.e. are there any reasons why I should not take part)?

If you are not a male competitive golfer, have not played in at least one competition within the last year and do not have a handicap between 0-5 then you should not take part in the study.

5. Will my participation involve any physical discomfort?

No

6. Will my participation involve any psychological discomfort or embarrassment?

No

7. Will I have to provide any bodily samples (i.e. blood, saliva)?

No

8. How will confidentiality be assured?

It order to ensure your confidentiality you will be allocated a participant identification number so that you are not personally identifiable on any of the data, to ensure this your consent form will be stored separately to your data (interview tapes and transcripts) in a locked filing cabinet. None of your personal details will be discussed at any point in the study write up. All electronic data stored on the computer will be password protected.

9. Who will have access to the information that I provide?

The principal investigator and the research team will have access to the data provided. Generalised information will be published but no personally identifiable information will be presented.

10. How will my information be stored / used in the future?

All data gathered will be stored in line with the data protection act and will be destroyed 3 years after the publication of the data. The data will be used by the research team to address the research question but no personally identifying information will be revealed. Insurance companies and employers will not be given any individual information nor will we allow access to the police, security services, social services, relatives, lawyers, unless forced to do so by the courts.

11. Has this investigation received appropriate ethical clearance?

Yes, the study and it's protocol has received full ethical approval from the School of Psychology and Sport Sciences Ethics Committee. If you require confirmation of this please contact the Chair of this Committee, stating the title of the research project and the name of the principle investigator:

Chair of School of Psychology and Sport Science Ethics Committee,

Northumberland Building,

Northumbria University,

Newcastle upon Tyne,

NE1 8ST

12. Will I receive any financial rewards / travel expenses for taking part?

No

13. How can I withdraw from the project?

The research you will take part in will be most valuable if few people withdraw from it, so please discuss any concerns you might have with the investigators. During the study itself, if you do decide that you do not wish to take any further part then please inform one of the research team as soon as possible, and they will facilitate your withdrawal. Any personal information or data that you have provided (be it in paper or electronic form) will be destroyed/deleted as soon as possible.

If, for any reason, you wish to withdraw your data after you have completed the research please contact the investigator (see contact details in section 11) within a month of your participation and give them your participant number or name if you have lost it and your data will be withdrawn. After this date, it may not be possible to withdraw your individual data as the results may already have been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

14. If I require further information who should I contact and how?

If you require and further information contact the Principal Investigator at fran.longstaff@northumbria.ac.uk or on 0191 227 4579. If you wish to register a complaint then please contact the Chair of the School Ethics Committee, details are provided in section 11.

PARTICIPANT DEBRIEF

TITLE OF PROJECT: The identification of specific situations during a competitive round of golf where golfers utilise imagery and/or self talk. (Part 1).

Principal Investigator: Fran Longstaff

Investigator contact details: Email: fran.longstaff@northumbria.ac.uk

Participant Identification Number: __________

1. What was the purpose of the project?

The purpose of the project was to identify the specific situations during a competitive round of golf where golfers employ the use of imagery and/or self talk. Previous research has revealed that golfers utilise imagery and or self talk to a greater extent in competition than practice and more specifically that golfers report the use of imagery and or self talk to a greater extent in certain scenarios during a competitive round. More interestingly golfers revealed that there were subtle differences in the way that they employed the use of imagery and self talk in different competitive situations.

It was deemed necessary for future research to examine how different types of imagery and or self talk were utilised in these specific scenarios. Before this could be done however specific detail regarding the scenarios needed to be established. For example although previous research had suggested that imagery and self talk were used to a greater extent at the beginning and end of a round detail was lacking regarding when the strategies were specifically employed during these time frames and what the features of these scenarios were. It is hoped that the information gathered in this study will inform the development of a situation specific imagery and self talk questionnaire.

2. How will I find out about the results?

If you provided your email address on your consent form then you will be sent a copy of the general results of the project two weeks after the completion of the data collection.

3. Will I receive any individual feedback

Individual feedback will not be made available, only general feedback. This is standard research practice and is done to protect your anonymity.

4. What will happen to the information I have provided?

The information that you provided will be stored in a locked filing cabinet. Completed consent forms, interview tapes and interview transcripts will be stored separately from one another to ensure your anonymity. All data stored on the computer will be protected by a computer password. Data will be destroyed 3 years after publication. Data will be viewed amongst the research team.

5. How will the results be disseminated?

The results will be written up as part of the Principal Investigator's PhD and will be used to inform the development of a survey assessing the types of imagery and self talk. The data may also be written up for publication and in an academic journal and presented at a conference. No information will be personally identifiable.

6. Have I been deceived in any way during the project?

No

7. If I change my mind and wish to withdraw the information I have provided, how do I do this?

If, for any reason, you wish to withdraw your data please contact the investigator within a month of your participation. After this date, it may not be possible to withdraw your individual data as the results may already have been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

"If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks after the study has concluded, then please contact Chair of the School Ethics Committee, Dr Nick Neave via email at nick.neave@northumbria.ac.uk."

Survey instructions

For the following questions on this survey THINK OF A 'STRESSFUL' GOLF STROKE THAT YOU MAY ENCOUNTER during competition. Examples of stressful strokes include:-

- The first tee shot in front of a crowd of people
- A stroke that you consistently have trouble with such as chip shots or short putts
- A difficult shot that you have to play after making a mistake on the previous hole
- A difficult shot where you need to clear a deep greenside bunker or water hazard

You may be able to think of other stressful strokes that are more relevant to you. This series of questions will ask you about your use of imagery and self-talk, during your walk towards the stressful golf stroke and when you are just about to execute the stressful golf stroke in competitions.

The first four questions will ask you about your use of imagery and self-talk during your walk towards the stressful golf stroke and the last four will ask you about your use of the strategies as you prepare to execute the golf stroke.

1) **DURING YOUR WALK TOWARDS THE GOLF BALL to what extent do you TALK yourself through playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly say to yourself

a. I talk myself through the technique of the golf swing/stroke
b. I talk myself through my plan of where I want the ball to go

Other (please specify).....

2) **During your walk towards the golf ball to what extent do you CREATE AN IMAGE of playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly imagine

a. I imagine my plan of where I want the ball to go
b. I imagine the technique of the golf swing/stroke

Other (please specify)

3) **During your walk towards the golf ball to what extent do you TALK to yourself to control your emotions for playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now please circle one phrase to specifically highlight what you mostly say to yourself

a. I talk myself into being confident in the execution of the golf stroke
b. I talk to myself to increase my motivation for the golf stroke
c. I talk to myself to control my nerves and worrying thoughts about the golf stroke

Other (please specify)

4) **During your walk towards the golf ball to what extent do you IMAGINE controlling your emotions for playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly imagine

a. I imagine myself being confident in the execution of the golf stroke
b. I imagine myself controlling my nerves and worrying thoughts about the golf stroke
c. I imagine the goal that I want to achieve to motivate me for the golf stroke

Other (please specify)

The following questions are about your use of imagery and self-talk as you are just about to execute the stressful golf stroke

5) **AS YOU ARE JUST ABOUT TO EXECUTE THE GOLF STROKE to what extent do you TALK yourself through playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly say to yourself

a. I talk myself through my plan of where I want the ball to go
b. I talk myself through the technique of the golf swing/stroke

Other (please specify)

6) **As you are just about to execute the golf stoke to what extent do you CREATE AN IMAGE of playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly imagine

a. I imagine the technique of the golf swing/stroke
b. I imagine my plan of where I want the ball to go

Other (please specify)

7) **As you are just about to execute the golf stroke to what extent do you TALK to yourself to control your emotions for playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now please circle one phrase to specifically highlight what you mostly say to yourself

a. I talk myself into being confident in the execution of the golf stroke
b. I talk to myself to increase my motivation for the golf stroke
c. I talk to myself to control my nerves and worrying thoughts about the golf stroke

Other (please specify)

8) **As you are just about to execute the golf stroke to what extent do you IMAGINE controlling your emotions for playing the golf stroke?**

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Now circle one phrase to specifically highlight what you mostly imagine

a. I imagine the goal that I want to achieve to motivate me for the production of the golf stroke
b. I imagine controlling my nerves and worrying thoughts about the golf stroke
c. I imagine being confident in the execution of the golf stroke

Other (please specify)

PARTICIPANT INFORMATION.

TITLE OF PROJECT: The use of imagery and self talk during the walk towards, and preparation to take, a stressful golf stroke in competitions.

Participant ID Number:

Principal Investigator: Fran Longstaff

Investigator contact details: Email: fran.longstaff@northumbria.ac.uk

This project is funded by: N/A

Number of participant points / payment: N/A

INFORMATION TO POTENTIAL PARTICIPANTS
1. What is the purpose of the project? The aim of this study is to examine how golfers use imagery and self talk during their walk towards a stressful golf stroke and when they are just about to execute a stressful golf stroke in competitions. Imagery and self talk are both psychological strategies. Imagery, often referred to as visualisation, is the creation or recreation of events or scenarios in the mind without physically performing them. Self talk refers to what people say to themselves either out loud or in their head.

2. Why have I been selected to take part?

You have been selected to take part because you are a male competitive golfer who has a handicap of 20 or below and is over the age of 18 years old.

3. What will I have to do?

You will firstly be asked to provide informed consent. You will then be asked to complete a short personal details survey (age, handicap, number of competitions played). Upon completion of this you will be asked to complete a survey that assesses the imagery and self talk methods that you use during your walk towards, and preparation to take, a stressful golf stroke. Finally you may be asked to complete the same survey one week later.

4. What are the exclusion criteria (i.e. are there any reasons why I should not take part)?

If you are not a male golfer over the age of 18, do not have a handicap of 20 or less and have not completed this season then you should not take part.

5. Will my participation involve any physical discomfort?

No

6. Will my participation involve any psychological discomfort or embarrassment?

No

7. Will I have to provide any bodily samples (i.e. blood, saliva)?

No

8. How will confidentiality be assured?

It order to ensure your confidentiality you will be allocated a participant identification number so that you are not personally identifiable on any of the data, to ensure this your consent form will be stored separately to your data. None of your personal details will be discussed at any point in the study write up. All questionnaires and demographic information will be stored separately to each other and the signed consent forms in a locked filing cabinet. All electronic data stored on the computer will be password protected.

9. Who will have access to the information that I provide?

The principal investigator and the research team will have access to the data provided. Generalised information will be published but no personally identifiable information will be presented.

10. How will my information be stored / used in the future?

All data gathered will be stored in line with the data protection act and will be destroyed 3 years after the publication of the data. The data will be used by the research team to address the research question but no personally identifying information will be revealed. Insurance companies and employers will not be given any individual information nor will we allow access to the police, security services, social services, relatives, lawyers, unless forced to do so by the courts.

11. Has this investigation received appropriate ethical clearance?

Yes, the study and its protocol has received full ethical approval from the School of Psychology and Sport Sciences Ethics Committee. If you require confirmation of this please contact the Chair of this Committee, stating the title of the research project and the name of the principal investigator:

Chair of School of Psychology and Sport Science Ethics Committee,

Northumberland Building,

Northumbria University,

Newcastle upon Tyne,

NE1 8ST

12. Will I receive any financial rewards / travel expenses for taking part?

No

13. How can I withdraw from the project?

The research you will take part in will be most valuable if few people withdraw from it, so please discuss any concerns you might have with the investigators. During the study itself, if you do decide that you do not wish to take any further part then please inform one of the research team as soon as possible, and they will facilitate your withdrawal. Any personal information or data that you have provided (be it in paper or electronic form) will be destroyed/deleted as soon as possible.

If, for any reason, you wish to withdraw your data after you have completed the research please contact the investigator (see contact details in section 14) within a month of your participation and give them your participant number or name if you have lost it and your data will be withdrawn. After this date, it may not be possible to withdraw your individual data as the results may already have been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

14. If I require further information who should I contact and how?

If you require and further information contact the Principal Investigator at fran.longstaff@northumbria.ac.uk or on 0191 227 4579. If you wish to register a complaint then please contact the Chair of the School Ethics Committee, details are provided in section 11.

PARTICIPANT DEBRIEF

TITLE OF PROJECT: The use of imagery and self talk during the walk towards, and preparation to take, a stressful golf stroke in competitions.

Principal Investigator: Fran Longstaff

Investigator contact details: Email: fran.longstaff@northumbria.ac.uk

Participant Identification Number: __________

1. What was the purpose of the project?

The purpose of the project was to examine how golfers utilised imagery and self talk during their walk towards, and preparation to take, a stressful golf stroke during competitions. Previous research has argued that when an athlete needs to control their arousal/anxiety levels they should use types of imagery and self talk that directly tackle these emotions. E.g. imagine themselves being at a certain arousal level or talk themselves into a certain arousal level.

A previous interview based project however provided some opposition to this suggestion finding that golfers did in fact use a variety of different imagery and self talk types in stressful times e.g. when stressed they sometimes imagined how to play a certain golf stroke rather than imagining their optimal emotional state. It was also suggested that the types of imagery and self talk used by the golfers was dependent on whether they were walking between golf strokes or just about to execute golf strokes. This project therefore aimed to quantify the types of imagery and self talk used by golfers during their walk towards and preparation to take a stressful golf stroke in competitions.

2. How will I find out about the results?

If you provided your email address on your consent form then you will be sent a copy of the general results of the project two weeks after the completion of the data collection.

3. Will I receive any individual feedback

Individual feedback will not be made available, only general feedback. This is standard research practice and is done to protect your anonymity.

4. What will happen to the information I have provided?

The information that you provided will be stored in a locked filing cabinet. Completed consent forms and questionnaires will be stored separately from one another to ensure your anonymity. All data stored on the computer will be protected by a computer password. Data will be destroyed 3 years after publication. Data will be viewed amongst the research team.

5. How will the results be disseminated?

The results will be written up as part of the Principal Investigator's PhD. The data may also be written up for publication in an academic journal and also presented at conferences. No information will be personally identifiable.

6. Have I been deceived in any way during the project?

No

7. If I change my mind and wish to withdraw the information I have provided, how do I do this?

If, for any reason, you wish to withdraw your data please contact the investigator within a month of your participation. After this date, it may not be possible to withdraw your individual data as the results may already have been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks after the study has concluded, then please contact Chair of the School Ethics Committee, Dr Nick Neave via email at nick.neave@northumbria.ac.uk**.**

Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Walk cognitive self talk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.020[a]	.000	-.007	1.06083

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.067	1	.067	.059	.808[a]
	Residual	160.926	143	1.125		
	Total	160.993	144			

a. Predictors: (Constant), Age

b. Dependent Variable: Walk cognitive self talk

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.339	.292		8.011	.000
	Age	.001	.006	.020	.243	.808

a. Dependent Variable: Walk cognitive self talk

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Walk cognitive imagery

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.082[a]	.007	.000	1.00049

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.972	1	.972	.971	.326[a]
	Residual	143.139	143	1.001		
	Total	144.110	144			

a. Predictors: (Constant), Age

b. Dependent Variable: Walk cognitive imagery

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.410	.275		8.753	.000
	Age	.006	.006	.082	.985	.326

a. Dependent Variable: Walk cognitive imagery

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Walk motivational self talk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.044[a]	.002	-.005	1.01472

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.283	1	.283	.275	.601[a]
	Residual	146.210	142	1.030		
	Total	146.493	143			

a. Predictors: (Constant), Age

b. Dependent Variable: Walk motivational self talk

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.992	.279		7.132	.000
	Age	.003	.006	.044	.524	.601

a. Dependent Variable: Walk motivational self talk

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Walk motivational imagery

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.074[a]	.005	-.002	.98538

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.759	1	.759	.782	.378[a]
	Residual	137.880	142	.971		
	Total	138.639	143			

a. Predictors: (Constant), Age

b. Dependent Variable: Walk motivational imagery

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.869	.271		6.886	.000
	Age	.005	.006	.074	.884	.378

a. Dependent Variable: Walk motivational imagery

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Execution cognitive self talk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.071[a]	.005	-.002	1.05199

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.806	1	.806	.728	.395[a]
	Residual	158.256	143	1.107		
	Total	159.062	144			

a. Predictors: (Constant), Age

b. Dependent Variable: Execution cognitive self talk

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.484	.290		8.578	.000
	Age	-.005	.006	-.071	-.853	.395

a. Dependent Variable: Execution cognitive self talk

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Execution cognitive imagery

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.015[a]	.000	-.007	1.02707

a. Predictors: (Constant), Age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.583	.283		9.135	.000
	Age	-.001	.006	-.015	-.178	.859

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.583	.283		9.135	.000
	Age	-.001	.006	-.015	-.178	.859

a. Dependent Variable: Execution cognitive imagery

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Execution motivational self talk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093[a]	.009	.002	1.02873

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.328	1	1.328	1.255	.265[a]
	Residual	151.334	143	1.058		
	Total	152.662	144			

a. Predictors: (Constant), Age

b. Dependent Variable: Execution motivational self talk

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.351	.283		8.302	.000
	Age	-.007	.006	-.093	-1.120	.265

a. Dependent Variable: Execution motivational self talk

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Age[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Execution motivational imagery

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.002[a]	.000	-.007	1.06128

a. Predictors: (Constant), Age

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	1	.001	.000	.982[a]
	Residual	159.937	142	1.126		
	Total	159.938	143			

a. Predictors: (Constant), Age

b. Dependent Variable: Execution motivational imagery

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.181	.292		7.461	.000
	Age	.000	.006	.002	.022	.982

a. Dependent Variable: Execution motivational imagery

Tests of Between-Subjects Effects

Measure:MEASURE_1

Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	5342.395	1	5342.395	1362.115	.000
CONGU_category	5.162	2	2.581	.658	.519
Error	541.254	138	3.922		

Tests of Within-Subjects Contrasts

Measure:MEASURE_1

Source	context	ps	coping	Type III Sum of Squares	df	Mean Square	F	Sig.
context	Linear			.789	1	.789	.958	.329
context * CONGU_category	Linear			6.218	2	3.109	3.774	.025
Error(context)	Linear			113.667	138	.824		
ps		Linear		10.792	1	10.792	11.320	.001
ps * CONGU_category		Linear		3.807	2	1.903	1.997	.140
Error(ps)		Linear		131.567	138	.953		
coping			Linear	30.415	1	30.415	31.079	.000
coping * CONGU_category			Linear	5.480	2	2.740	2.800	.064
Error(coping)			Linear	135.054	138	.979		
context * ps	Linear	Linear		.595	1	.595	1.661	.200
context * ps * CONGU_category	Linear	Linear		.524	2	.262	.731	.483
Error(context*ps)	Linear	Linear		49.460	138	.358		
context * coping	Linear		Linear	.580	1	.580	1.321	.252
context * coping * CONGU_category	Linear		Linear	.341	2	.170	.388	.679
Error(context*coping)	Linear		Linear	60.569	138	.439		
ps * coping		Linear	Linear	3.135	1	3.135	6.793	.010
ps * coping * CONGU_category		Linear	Linear	.494	2	.247	.535	.587
Error(ps*coping)		Linear	Linear	63.699	138	.462		
context * ps * coping	Linear	Linear	Linear	.552	1	.552	1.491	.224

context * ps * coping * CONGU_category	Linear	Linear	Linear	.486	2	.243	.656	.520
Error(context*ps*coping)	Linear	Linear	Linear	51.069	138	.370		

Problem focussed self-talk when walking

Crosstab

			One			Total
			technical	strategy	instructional	
CONGU_category	1.00	Count	5	19	0	24
		Expected Count	6.4	17.4	.2	24.0
		% within CONGU_category	20.8%	79.2%	.0%	100.0%
		% within One	15.6%	21.8%	.0%	20.0%
		% of Total	4.2%	15.8%	.0%	20.0%
	2.00	Count	8	32	0	40
		Expected Count	10.7	29.0	.3	40.0
		% within CONGU_category	20.0%	80.0%	.0%	100.0%
		% within One	25.0%	36.8%	.0%	33.3%
		% of Total	6.7%	26.7%	.0%	33.3%
	3.00	Count	19	36	1	56
		Expected Count	14.9	40.6	.5	56.0
		% within CONGU_category	33.9%	64.3%	1.8%	100.0%
		% within One	59.4%	41.4%	100.0%	46.7%
		% of Total	15.8%	30.0%	.8%	46.7%
Total		Count	32	87	1	120
		Expected Count	32.0	87.0	1.0	120.0
		% within CONGU_category	26.7%	72.5%	.8%	100.0%
		% within One	100.0%	100.0%	100.0%	100.0%
		% of Total	26.7%	72.5%	.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.202[a]	4	.379
Likelihood Ratio	4.590	4	.332
Linear-by-Linear Association	.030	1	.862
N of Valid Cases	120		

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.202[a]	4	.379
Likelihood Ratio	4.590	4	.332
Linear-by-Linear Association	.030	1	.862
N of Valid Cases	120		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .20.

Problem focussed imagery when walking

Crosstab

			Two			
			technical	strategy	both	Total
CONGU_category	1.00	Count	4	20	1	25
		Expected Count	6.2	18.3	.6	25.0
		% within CONGU_category	16.0%	80.0%	4.0%	100.0%
		% within Two	12.9%	21.7%	33.3%	19.8%
		% of Total	3.2%	15.9%	.8%	19.8%
	2.00	Count	10	32	1	43
		Expected Count	10.6	31.4	1.0	43.0
		% within CONGU_category	23.3%	74.4%	2.3%	100.0%
		% within Two	32.3%	34.8%	33.3%	34.1%
		% of Total	7.9%	25.4%	.8%	34.1%
	3.00	Count	17	40	1	58
		Expected Count	14.3	42.3	1.4	58.0
		% within CONGU_category	29.3%	69.0%	1.7%	100.0%
		% within Two	54.8%	43.5%	33.3%	46.0%
		% of Total	13.5%	31.7%	.8%	46.0%
Total		Count	31	92	3	126
		Expected Count	31.0	92.0	3.0	126.0
		% within CONGU_category	24.6%	73.0%	2.4%	100.0%
		% within Two	100.0%	100.0%	100.0%	100.0%
		% of Total	24.6%	73.0%	2.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.996[a]	4	.737
Likelihood Ratio	2.035	4	.729
Linear-by-Linear Association	1.422	1	.233
N of Valid Cases	126		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .60.

Problem focussed self-talk before executing golf strokes

Crosstab

			Five		Total
			technique	strategy	
CONGU_category	1.00	Count	7	17	24
		Expected Count	8.6	15.4	24.0
		% within CONGU_category	29.2%	70.8%	100.0%
		% within Five	15.9%	21.5%	19.5%
		% of Total	5.7%	13.8%	19.5%
	2.00	Count	12	28	40
		Expected Count	14.3	25.7	40.0
		% within CONGU_category	30.0%	70.0%	100.0%
		% within Five	27.3%	35.4%	32.5%
		% of Total	9.8%	22.8%	32.5%
	3.00	Count	25	34	59
		Expected Count	21.1	37.9	59.0
		% within CONGU_category	42.4%	57.6%	100.0%
		% within Five	56.8%	43.0%	48.0%
		% of Total	20.3%	27.6%	48.0%
Total		Count	44	79	123
		Expected Count	44.0	79.0	123.0
		% within CONGU_category	35.8%	64.2%	100.0%
		% within Five	100.0%	100.0%	100.0%
		% of Total	35.8%	64.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.155[a]	2	.341
Likelihood Ratio	2.159	2	.340
Linear-by-Linear Association	1.775	1	.183
N of Valid Cases	123		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.59.

Problem focussed imagery before executing golf strokes

Crosstab

			Six			
			technique	strategy	shot dependent	Total
CONGU_category	1.00	Count	10	16	0	26
		Expected Count	9.3	16.5	.2	26.0
		% within CONGU_category	38.5%	61.5%	.0%	100.0%
		% within Six	21.7%	19.5%	.0%	20.2%
		% of Total	7.8%	12.4%	.0%	20.2%
	2.00	Count	14	30	1	45
		Expected Count	16.0	28.6	.3	45.0
		% within CONGU_category	31.1%	66.7%	2.2%	100.0%
		% within Six	30.4%	36.6%	100.0%	34.9%
		% of Total	10.9%	23.3%	.8%	34.9%
	3.00	Count	22	36	0	58
		Expected Count	20.7	36.9	.4	58.0
		% within CONGU_category	37.9%	62.1%	.0%	100.0%
		% within Six	47.8%	43.9%	.0%	45.0%
		% of Total	17.1%	27.9%	.0%	45.0%
Total		Count	46	82	1	129
		Expected Count	46.0	82.0	1.0	129.0

	% within CONGU_category	35.7%	63.6%	.8%	100.0%
	% within Six	100.0%	100.0%	100.0%	100.0%
	% of Total	35.7%	63.6%	.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.374[a]	4	.667
Likelihood Ratio	2.622	4	.623
Linear-by-Linear Association	.097	1	.755
N of Valid Cases	129		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .20.

Emotion focussed self-talk when walking

Crosstab

			Three			Total
			confidence	anxiety	motivation	
CONGU_category	1.00	Count	17	4	4	25
		Expected Count	13.3	5.0	6.7	25.0
		% within CONGU_category	68.0%	16.0%	16.0%	100.0%
		% within Three	26.6%	16.7%	12.5%	20.8%
		% of Total	14.2%	3.3%	3.3%	20.8%
	2.00	Count	22	6	12	40
		Expected Count	21.3	8.0	10.7	40.0
		% within CONGU_category	55.0%	15.0%	30.0%	100.0%
		% within Three	34.4%	25.0%	37.5%	33.3%
		% of Total	18.3%	5.0%	10.0%	33.3%
	3.00	Count	25	14	16	55
		Expected Count	29.3	11.0	14.7	55.0
		% within CONGU_category	45.5%	25.5%	29.1%	100.0%
		% within Three	39.1%	58.3%	50.0%	45.8%
		% of Total	20.8%	11.7%	13.3%	45.8%
Total		Count	64	24	32	120
		Expected Count	64.0	24.0	32.0	120.0
		% within CONGU_category	53.3%	20.0%	26.7%	100.0%
		% within Three	100.0%	100.0%	100.0%	100.0%
		% of Total	53.3%	20.0%	26.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.542[a]	4	.338
Likelihood Ratio	4.661	4	.324
Linear-by-Linear Association	2.702	1	.100
N of Valid Cases	120		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Emotion focussed imagery when walking

Crosstab

			Four			Total
			confidence	anxiety	motivation	
CONGU_category	1.00	Count	17	4	4	25
		Expected Count	12.4	6.3	6.3	25.0
		% within CONGU_category	68.0%	16.0%	16.0%	100.0%
		% within Four	27.9%	12.9%	12.9%	20.3%
		% of Total	13.8%	3.3%	3.3%	20.3%
	2.00	Count	24	5	12	41
		Expected Count	20.3	10.3	10.3	41.0
		% within CONGU_category	58.5%	12.2%	29.3%	100.0%
		% within Four	39.3%	16.1%	38.7%	33.3%
		% of Total	19.5%	4.1%	9.8%	33.3%
	3.00	Count	20	22	15	57
		Expected Count	28.3	14.4	14.4	57.0
		% within CONGU_category	35.1%	38.6%	26.3%	100.0%
		% within Four	32.8%	71.0%	48.4%	46.3%
		% of Total	16.3%	17.9%	12.2%	46.3%
Total		Count	61	31	31	123
		Expected Count	61.0	31.0	31.0	123.0
		% within CONGU_category	49.6%	25.2%	25.2%	100.0%
		% within Four	100.0%	100.0%	100.0%	100.0%
		% of Total	49.6%	25.2%	25.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.574[a]	4	.009
Likelihood Ratio	13.957	4	.007
Linear-by-Linear Association	4.885	1	.027
N of Valid Cases	123		

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.574[a]	4	.009
Likelihood Ratio	13.957	4	.007
Linear-by-Linear Association	4.885	1	.027
N of Valid Cases	123		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.30.

Emotion focussed self-talk execution

Crosstab

			Seven			
			confidence	anxiety	motivation	Total
CONGU_category	1.00	Count	17	3	4	24
		Expected Count	14.2	4.6	5.2	24.0
		% within CONGU_category	70.8%	12.5%	16.7%	100.0%
		% within Seven	23.9%	13.0%	15.4%	20.0%
		% of Total	14.2%	2.5%	3.3%	20.0%
	2.00	Count	25	8	8	41
		Expected Count	24.3	7.9	8.9	41.0
		% within CONGU_category	61.0%	19.5%	19.5%	100.0%
		% within Seven	35.2%	34.8%	30.8%	34.2%
		% of Total	20.8%	6.7%	6.7%	34.2%
	3.00	Count	29	12	14	55
		Expected Count	32.5	10.5	11.9	55.0
		% within CONGU_category	52.7%	21.8%	25.5%	100.0%
		% within Seven	40.8%	52.2%	53.8%	45.8%
		% of Total	24.2%	10.0%	11.7%	45.8%
Total		Count	71	23	26	120
		Expected Count	71.0	23.0	26.0	120.0

	% within CONGU_category	59.2%	19.2%	21.7%	100.0%
	% within Seven	100.0%	100.0%	100.0%	100.0%
	% of Total	59.2%	19.2%	21.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.450[a]	4	.654
Likelihood Ratio	2.509	4	.643
Linear-by-Linear Association	1.938	1	.164
N of Valid Cases	120		

a. 1 cells (11.1%) have expected count less than 5. The minimum expected count is 4.60.

Emotion focussed imagery execution

Crosstab

			Eight			
			confidence	anxiety	motivation	Total
CONGU_category	1.00	Count	12	5	9	26
		Expected Count	10.5	6.1	9.4	26.0
		% within CONGU_category	46.2%	19.2%	34.6%	100.0%
		% within Eight	25.0%	17.9%	20.9%	21.8%
		% of Total	10.1%	4.2%	7.6%	21.8%
	2.00	Count	16	9	15	40
		Expected Count	16.1	9.4	14.5	40.0
		% within CONGU_category	40.0%	22.5%	37.5%	100.0%
		% within Eight	33.3%	32.1%	34.9%	33.6%
		% of Total	13.4%	7.6%	12.6%	33.6%
	3.00	Count	20	14	19	53
		Expected Count	21.4	12.5	19.2	53.0
		% within CONGU_category	37.7%	26.4%	35.8%	100.0%

	% within Eight	41.7%	50.0%	44.2%	44.5%
	% of Total	16.8%	11.8%	16.0%	44.5%
Total	Count	48	28	43	119
	Expected Count	48.0	28.0	43.0	119.0
	% within CONGU_category	40.3%	23.5%	36.1%	100.0%
	% within Eight	100.0%	100.0%	100.0%	100.0%
	% of Total	40.3%	23.5%	36.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.756[a]	4	.944
Likelihood Ratio	.755	4	.944
Linear-by-Linear Association	.175	1	.676
N of Valid Cases	119		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.12.

Instructions

This questionnaire concerns two ways of mentally performing movements which are used by some people more than by others, and are more applicable to some types of movements than others. The first is attempting to form a visual image or picture of a movement in your mind. The second is attempting to feel what performing a movement is like without actually doing the movement. You are requested to do both of these mental tasks for a variety of movements in this questionnaire, and then rate how easy/difficult you found the tasks to be. The ratings that you give are not designed to assess the goodness or badness of the way that you perform these mental tasks. They are attempts to discover the capacity individuals show for performing these tasks for different movements. There are no right or wrong ratings or some ratings that are better than others.

Each of the following statements describes a particular action or movement. Read each statement carefully and then actually perform the movement described. Only perform the movement a single time. Return to the starting position for the movement just as if you were going to perform the action a second time. Then depending on which of the following you are asked to do, either 1) form as clear and vivid a visual images as possible of the movement just performed, or 2) attempt to feel yourself making the movement just performed without actually doing it.

After you have completed the mental task required, rate the ease/difficulty with which you were able to do the task. Task your rating form the following scale. Be as accurate as possible and take as long as you feel necessary to arrive at the proper rating for each movement. You may choose the same rating for any number of movements 'seen' or 'felt' and it is not necessary to utilise the entire length of the scale.

RATING SCALES

Visual Imagery Scale

7	6	5	4	3	2	1
Very easy To see	Easy to see	Somewhat Easy to see	Neutral (Not easy not hard)	Somewhat Hard to see	Hard to see	Very Hard to see

Kinaesthetic Imagery Scale

7	6	5	4	3	2	1
Very easy To Feel	Easy to Feel	Somewhat easy to feel	Neutral (Not easy not hard)	Somewhat Hard to Feel	Hard to Feel	Very Hard to Feel

1. **STARTING POSITION:** Stand with your feet and legs together and your arms at your sides.

   ACTION: Raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet. Perform these actions slowly.

   MENTAL TASK: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

2. **STARTING POSITION:** Stand with your feet slightly apart and your hands at your sides.

   ACTION: Bend down low and then jump straight up in the air as high as possible with both arms extended above the head. Land with your feet apart and lower your arms to your sides.

   MENTAL TASK: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

3. **STARTING POSITION:** Extend the arm of your nondominant hand straight out to your side so that it is parallel to the ground, palm down.

   ACTION: Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly.

   MENTAL TASK: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

4. **STARTING POSITION:** Stand with your feet slightly apart and your arms fully extended above your head.

   ACTION: Slowly bend forward at the waist and try and touch your toes with your fingertips (or if possible, touch the floor with your fingertips or hands). Now return to the starting position, standing erect with your arms extended above your head.

MENTAL TASK: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

4. **STARTING POSITION:** Stand with your feet slightly apart and your hands at your sides.

ACTION: Bend down low and then jump straight up into the air as high as possible with both arms extended above the head. Land with your feet apart and lower your hands to your sides.

MENTAL TASK: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

6. **STARTING POSITION:** Stand with your feet and legs together and your arms at your sides.

ACTION: Raise your right knee as high as possible so that you are standing on are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are standing on two feet. Perform these actions slowly.
MENTAL TASK: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

7. **STARTING POSITION:** Stand with your feet slightly apart and your arms fully extended above your head.

ACTION: Slowly bend forward at the waist and try and touch your toes with your fingertips (or if possible, touch the floor with your fingertips or hands). Now return to the starting position, standing erect with your arms extended above your head.

MENTAL TASK: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

8. **STARTING POSITION:** Extend the arm of your non dominant hand straight out to your side so that it is parallel to the ground, palm down.

ACTION: Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly.

MENTAL TASK: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

Rating

PARTICIPANT INFORMATION.

TITLE OF PROJECT: The use of imagery and self talk to cope with stressful shots.

Participant ID Number:

Principal Investigator: Fran Longstaff

Investigator contact details: fran.longstaff@northumbria.ac.uk

This project is funded by: N/A

Number of participant points / payment: N/A

INFORMATION TO POTENTIAL PARTICIPANTS
1. What is the purpose of the project? The purpose of the study is to examine the effect that imagery and self talk training has on golfers'performance of stressful golf strokes over the course of a 6-7 week period. Imagery, often referred to as visualisation, is the creation or recreation of events or scenarios without physically performing them e.g. a golfer may imagine winning a tournament or performing a specific golf stroke. Self talk refers to the dialogue that a person has with themselves either outloud or in their head e.g. a golfer may provide themselves with instructions or talk to themselves for motivation purposes.

Both strategies are used widely by golfers and it is of interest to see if the use of these strategies can be trained and can affect performance.

2. Why have I been selected to take part?

You have been selected because you are a competitive male golfer (18 years +) who competes in at least two competitions per week.

3. What will I have to do?

You will be asked to record your performance and complete some questionnaires about your golf experiences over a 6-7 week period. You will be administered two phases of psychological skills training over the course of this time period and will be asked to use them when competing and practice them three times a week at home for 10 minutes.

4. What is the exclusion criteria (i.e. are there any reasons why I should not take part)?

If you do not play golf, do not play two competitions a week, are not male and 18 years old and above you should not take part in the study.

5. Will my participation involve any physical discomfort?

No

6. Will my participation involve any psychological discomfort or embarrassment?

No

7. Will I have to provide any bodily samples (i.e. blood, saliva)?

No

8. How will confidentiality be assured?

The research team has put into place a number of procedures to protect the confidentiality of participants. These include:

You will be allocated a participant code that will always be used to identify any data that you provide. Your name or other personal details will not be associated with your data, for example the consent form that you sign will be kept separate from your data.

All paper records will be stored in a locked filing cabinet, accessible only to the research team, and all electronic information will be stored on a password-protected computer. In general all of the information you provide will be treated in accordance with the Data

Protection Act.

9. Who will have access to the information that I provide?

Any information and data gathered during this research study will only be available to the research team identified in the information sheet. Should the research be presented or published in any form, then that information will be generalized (i.e. your personal information or data will not be identifiable).

10. How will my information be stored / used in the future?

All information and data gathered during this research will be stored in line with the Data Protection Act and will be destroyed 3 years following the conclusion of the study. During that time the data may be used by members of the research team only for purposes appropriate to the research question, but at no point will your personal information or data be revealed. Insurance companies and employers will not be given any individual's information, samples, or test results, and nor will we allow access to the police, security services, social services, relatives or lawyers, unless forced to do so by the courts.

11. Has this investigation received appropriate ethical clearance?

Yes, the study and its protocol has received full ethical approval from the School of Psychology & Sport Sciences Ethics Committee. If you require confirmation of this please contact the Chair of this Committee, stating the title of the research project and the name of the principle investigator:

Chair of School of Psychology & Sport Science Ethics Committee,

Northumberland Building,

Northumbria University,

Newcastle upon Tyne,

NE1 8ST

12. Will I receive any financial rewards / travel expenses for taking part?

Yes, you will receive £100 for your participation in the study. This money can be claimed upon completion of the study.

13. How can I withdraw from the project?

The research you will take part in will be most valuable if few people withdraw from it, so please discuss any concerns you might have with the investigators. During the study itself, if you do decide that you do not wish to take any further part then please inform one of the research team as soon as possible, and they will facilitate your withdrawal. Any personal information or data that you have provided (be it in paper or electronic form) will be destroyed/deleted as soon as possible.

After you have completed the research if for any reason, you wish to withdraw your data please contact the investigator (contact details in section 14) within a month of your participation. After this date, it may not be possible to withdraw your individual data as the results may already have been published. As all data are anonymised, your individual data will not be identifiable in any way.

14. If I require further information who should I contact and how?

If you require and further information contact the Principal Investigator at fran.longstaff@northumbria.ac.uk or on 0191 227 4579. If you wish to register a complaint then please contact the Chair of the School Ethics Committee, details are provided in section 11.

Performance measure instructions

For all club competitions played over the course of the next 6-7 weeks, on your home course, please complete the score cards. Before you start each competition insert the date and what competition you are playing in. This score card should only be completed for full 18 hole single competitions (e.g. medal, strokeplay, stableford.).

After each hole on the score card indicate whether the fairways and greens were hit in regulation, the number of putts you took, the number of stressful shots you were challenged with and how many of these stressful shots you felt you played successfully. In addition to this for each hole insert how many strokes you played in total.

Fairway in regulation = a fairway is considered hit if any part of the ball is touching the fairway surface after the tee shot. These are not applicable on par 3 holes so leave these blank. When you hit the fairway mark your scorecard with a Y for yes. If you miss the fairway mark the scorecard with an N for no.

Green in regulation = Score this according to your handicap. In order to work out whether you have hit a green in regulation deduct 2 from the par of the hole dependent on your handicap. E.g. if the first hole is a par 4 you will have hit the green in regulation if you made it in 2 shots. For each hole on the scorecard if you hit the green in regulation mark the column with Y for yes, if you miss mark the column with an N for no.

Number of putts = In this section just insert the number of putts you took to hole the ball. If you use your putter off the green it does not count as a putt so it is possible to 0 putt. You must count gimmes in this total.

Total score for the hole = In this column indicate the total number of strokes played to hole the ball for that hole.

Number of stressful strokes/shots = In this column state how many strokes/shots you found stressful during the hole. Stressful strokes/shots are those that you may find challenging or difficult, essentially any that apply a bit more pressure. Examples of stressful shots include the first tee, taking a shot after making a mistake on the previous hole, taking a short putt etc. Different golfers find different shots stressful. You may find that the shots you find stressful on one hole are different on others.

Number of stressful shots that were successfully executed = Here state how many of the stressful shots that you were challenged with were successfully executed.

Total = In the total row at the bottom of the score card indicate the total amount fairways that were successfully hit in regulation, how many greens were successfully hit in regulation, the total number of putts you took over the course of the whole round, the total number of stressful shots that you were presented with during the entire round and the total number of stressful shots that you successfully executed. Finally also insert the total number of strokes that you played during the entire round (this should be gross).

At the end of each round. Contact me with your scores.

- The total number of fairways that were hit in regulation
- The total number of greens that were hit in regulation
- The total number of putts played over the round
- The total number of stressful shots that you were presented with
- The total number of stressful shots that you successfully executed
- The total number of strokes that you played during the entire round

Once you have passed this information onto me place the scorecard in the relevant envelope provided and I will take these from you at the end of this phase of the study.

Participant ID number: ________________

Date: ________________

Competition: ____________________________

Competition number: ______________________

Hole	Fairway hit in regulation	Green in regulation	Number of putts	Number of stressful strokes/shots	Number of stressful strokes/shots successfully executed	Total score for the hole
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
Total						

Participant: **Date:**

Phase 1

	Strongly disagree				**Strongly agree**
Since I started recording my performance I have been performing consistently	1	2	3	4	5
Since I started recording my performance I have been:-	**Not at all**				**Extremely**
- Nervous about taking stressful golf strokes/shots	1	2	3	4	5
- Confident when taking stressful golf strokes/shots	1	2	3	4	5
- Focussed when taking stressful golf strokes/shots	1	2	3	4	5
- Motivated when taking stressful golf strokes/shots	1	2	3	4	5
- Clear about how I plan to play stressful golf strokes/ shots	1	2	3	4	5
	Strongly disagree				**Strongly agree**
It is important to me to improve my golf performance	1	2	3	4	5
I am a highly competitive golfer	1	2	3	4	5
Taking recordings of my performance has interrupted the way that I play	1	2	3	4	5

Any other comments?

Participant: **Date:**

Phase 2

	Strongly disagree				**Strongly agree**
I feel my overall performance has improved since I started using imagery	1	2	3	4	5
I feel I am performing more consistently since I started using imagery	1	2	3	4	5
I feel my performance of stressful golf strokes/shots has improved since I started using imagery	1	2	3	4	5

Since I started using imagery I have been:-	**Not at all**				**Extremely**
- Nervous about taking stressful golf strokes/shots	1	2	3	4	5
- Confident when taking stressful golf strokes/shots	1	2	3	4	5
- Focussed whentaking stressful golf strokes/shots	1	2	3	4	5
- Motivated when taking stressful golf strokes/shots	1	2	3	4	5
- Clear about how I plan to play stressful golf strokes/ shots	1	2	3	4	5

	Strongly disagree				Strongly agree
I have found the use of imagery useful	1	2	3	4	5
I have found the imagery training enjoyable	1	2	3	4	5
I have adhered to the practice imagery	1	2	3	4	5
I have adhered to using imagery during competitions	1	2	3	4	5
I will continue to use imagery	1	2	3	4	5
	Not at all				**Extremely**
I am pleased with the results of the imagery training	1	2	3	4	5

Have you been imagining any other things in relation to your golf performance?

Before this imagery training were you using imagery?

During this phase of training have you found yourself using any self talk when you have been using your imagery?

Any other comments?

Participant: **Date:**

Phase 3

	Strongly disagree				**Strongly agree**
I feel my overall performance has improved since I started using imagery and self talk together	1	2	3	4	5
I feel I am performing more consistently since I started using imagery and self talk together	1	2	3	4	5
I feel my performance of stressful golf strokes has improved since I started using imagery and self talk together	1	2	3	4	5

Since I started using imagery and self talk together I have been:-	**Not at all**				**Extremely**
- Nervous about taking stressful golf strokes/shots	1	2	3	4	5
- Confident when taking stressful golf strokes/shots	1	2	3	4	5
- Focussed whentaking stressful golf strokes/shots	1	2	3	4	5
- Motivated when taking stressful golf strokes/shots	1	2	3	4	5
- Clear about how I plan to play stressful golf strokes/ shots	1	2	3	4	5

The use of self talk:-	Strongly disagree				Strongly agree
- Made my imagery clearer	1	2	3	4	5
- Made decisions about my shot choice clearer	1	2	3	4	5
- Helped me correct incorrect images	1	2	3	4	5
	Strongly disagree				**Strongly agree**
I have found the use of imagery and self talk together useful	1	2	3	4	5
I have found the imagery and self talk training enjoyable	1	2	3	4	5
I adhered to the practice of imagery and self talk	1	2	3	4	5
I adhered to using imagery and self talk together during competitions	1	2	3	4	5
I will continue to use imagery and self talk together	1	2	3	4	5
	Not at all				**Extremely**
I am pleased with the results of the imagery and self talk training	1	2	3	4	5

I feel my performance of
stressful golf strokes was best
when I used:-
(please circle one of the following)

- No strategies
- Imagery
- Imagery and self talk together

Have you been imagining any of other things in relation to your golf performance during this phase?

Have you been using any other self talk in relation to your golf performance during this phase?

Before the self talk training were you using any self talk?

Any other comments?

PARTICIPANT DEBRIEF

TITLE OF PROJECT: The use of imagery and self talk to cope with stressful shots.

Principal Investigator: Fran Longstaff

Investigator contact details:

Email: fran.longstaff@northumbria.ac.uk

Participant Identification Number: __________

1. What was the purpose of the project?

The main purpose of the study was to examine the effect that imagery and self talk training had on golfers'performance of stressful golf strokes. Previous research has revealed that golfers employ the use of both strategies when presented with a stressful shot and the purpose of the study was to assess whether the combined use of these strategies could be taught to golfers and could positively affect performance.

Previous research has revealed that golfers use imagery and self talk most in response to stressful shots. In particular the use of the strategies is emphasised during the walk towards the golf ball. When presented with a stressful shot golfers have been found to use imagery most where they imagine their plan of where they want to play the ball. In addition to this previous studies have revealed that golfers also follow their use of imagery with self talk to add clarity and/or correct the images experienced. The purpose of the study was to assess the effectiveness of imagery and imagery followed immediately by self talk on golf performance.

2. How will I find out about the results?

Approximately 2 months after taking part, the researcher will email you a general summary of the results if you indicated that you would like them on the consent document.

3. Will I receive any individual feedback

No individual feedback will be provided. This is standard research practice and is to protect your anonymity.

4. What will happen to the information I have provided?

The data provided will be stored safely, will remain confidential and will be destroyed 3 years after its completion.

5. How will the results be disseminated?

The data will be presented as part of a PhD, might be published in a scientific journal or may be presented at a conference. All data will remain confidential and no information will be personally identifiable.

6. Have I been deceived in any way during the project?

No although you were originally selected because of your low scores of imagery and self talk use in a previous study.

7. If I change my mind and wish to withdraw the information I have provided, how do I do this?

If, for any reason, you wish to withdraw your data please contact the investigator within a month of your participation. After this date, it may not be possible to withdraw your individual data as the results may already have been published. As all data are anonymised, your individual data will not be identifiable in any way.

If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks after the study has concluded, then please contact Chair of the School Ethics Committee, Dr Nick Neave via email at nick.neave@northumbria.ac.uk.

Imagery

What is imagery?

Imagery is a useful and hugely popular psychological strategy. Imagery, often referred to as visualisation, is the creation or re-creation of skills, events or scenarios in the mind without physically performing them. Golfers can imagine lots of different things when they use imagery. For example golfers may find themselves imagining the technique of a golf swing, or winning a competition and the feelings associated with this or how they will perform in certain scenarios etc.

Imagery is an effective psychological strategy. 99% of Olympic athletes and two of the most successful golfers in history have reported its use and importance.

"Before every shot I go to the movies inside my head. Here is what I see. First, I see the ball where I want it to finish, nice and white and sitting up high on the bright green grass. Then I see the ball going there; its path and trajectory and even its behaviour on landing. The next scene shows me making the kind of swing that will turn the previous image into reality. These home movies are a key to my concentration and to my positive approach to every shot.'

Jack Nicklaus, 1976

In addition to this when Tiger Woods was a boy and playing in his first international tournament his father asked him what he was thinking about on the first tee and he said where he wanted the ball to go. Even at that age Tiger Woods was visualising his shots.

Many Sport Psychologists recommend the use of imagery. This is partly due to the positive effects that imagery has been found to have on performance. More specifically extensive research has found imagery to have a positive effect on golfers' performance with more skilled elite golfers being found to use more imagery than less skilled golfers. In addition to this imagery training has also been found to positively affect golfers' performance of putts and chip shots and other shots that they feel they need to improve.

Using imagery to plan strokes/shots

Different types of imagery exist. There are two predominant types of imagery; cognitive and motivational imagery.

Cognitive imagery is essentially skill orientated imagery and often involves the imagination of the techniques of golf strokes/swings or plans of where golfers want to play strokes/shots and how they want it to react in the prevailing conditions.

Motivational imagery involves the imagination of particular emotions. For example a golfer may imagine winning a competition and the adulation associated with this which can result in an increase in their levels of self confidence.

Similarly to the practice of physical skills psychological skills can also be trained and practiced. For the purpose of this intervention we will look at training your use of **cognitive imagery**. In particular we will focus on **developing your use of imagery to plan how, and where you want to play strokes/shots that you find particularly stressful**. We will look to equip you with the necessary imagery skills so that you can use them in competition when you are presented with the shots/strokes that you find stressful.

How does imagery work?

It is widely accepted that imagery can improve performance and as such many researchers have looked to examine how imagery actually results in performance improvements. It is argued that imagery works by strengthening the mental blueprints for the production of certain strokes/shots. Each stoke/shot can be stored in the mind as a mental blueprint and imagery essentially works by developing and adding clarity to these blueprints.

Exercise: you can test this theory by standing up and imagining yourself falling backwards. Did you experience any sensations?

Imagery perspectives

When using imagery to plan strokes/shots internal or external perspectives can be used. Internal imagery involves imagining a stroke/shot as if seeing it through your own eyes. External imagery involves imagining as stroke/shot as if standing outside of your body and seeing yourself taking that shot. Both perspectives can be used.

Imagine playing a golf stroke/shot. Which perspective do you use?

....
....
....

Training your imagery skills

Before you can use imagery during competition to plan how you want to play stressful golf strokes you firstly need to practice using your imagery ‘muscles’ and develop your ability to use imagery. There are two primary elements of imagery that need to be trained in order for imagery to be as effective as it can be. These are detailed below.

Creating vivid images

In order for imagery to be effective golfers need to ensure that the images that they create are clear and vivid. It is widely accepted that the more vivid the imagery, the greater the performance effects. When imagining a golf stroke you can use lots of different senses e.g. imagine what the shot looks like, what it sounds like when you hit the ball, what it feels like and what the surrounding smells are. It is important to create vivid images when using imagery to plan where you want to hit the ball so that you are clear and certain about how it will react in the conditions. Below are three exercises that can be practiced at home in order help you create more vivid and fuller images.

Exercise 1

Imagine you are waiting to tee off. Imagine the sound of your fellow golfers' golf clubs rattling in their golf bags as they prepare for their round. Feel the gentle breeze on your face as you wait. As you wait you feel the heat from the sun bearing down on your skin and take a deep breath and smell the freshly cut grass. You can hear the other golfers quietly chatting around you and the sound of the golfer in the group in front of you teeing off as their club strikes the ball. Take in all the colours, the colours of your equipment, your clothes, the trees and the course surrounding you. Notice the sway of leaves in the wind. Now you turn your attention to your golf bag, you look at its contents and remove your putter from the bag. You feel the cool head of the putter in your hand. You then turn the putter the other way up so that you are now holding the grip. Feel the rubber from the grip in your hands.

Exercise 2

Imagine you are walking towards the golf ball. You can see the ball lying on the putting green about 12 feet away from the hole. Imagine the rattling of your clubs as you walk towards it and the quiet chatter between the other golfers walking with you. Imagine that you have now approached the golf ball, remove your putter from your bag and imagine the feel of the cool club head in your hand and then the feel of the rubber grip. Imagine the heat from the sun on your skin and the gentle bounce under your feet as you walk over the green. Now imagine the stillness and quietness as you are just about to take the putt. Imagine the stance you are in for taking putt. You take a few practice strokes and think about where you want the ball to go. You now move to take the putt. Feel the movement as you take the putt and imagine the sound as the ball connects with the putter. Now visualise the ball rolling over the green, see how it reacts and bounces over some of the divets on the green. The pace of the ball starts to slow as it reaches the hole and then you hear the sound of the ball as lands in the hole and hits the bottom.

Exercise 3

Imagine you are walking towards your ball that is lying in a bunker. You can smell the sand that is slightly damp after a light rain shower. You can hear your fellow golfers chatting as you walk towards the ball. As you make it to the bunker you remove your wedge and feel the cold metal head in your hands. You now make your way into the bunker. The sand is soft underfoot. You get to shot and turn your club around so that you are now holding the grip. You get into the stance for playing the shot and look at the lie of the ball and where you want it to go after you have struck it. You strike the ball and it lifts up into the air sharply and then starts its descent down to the green where it bounces three times, rolls and then stops.

Controlling your images

When using imagery it is important to try and keep your images positive and not allow them to become negative. For example, if you are presented with a stressful golf stroke it is important to imagine how you can best play the shot without the images becoming negative. Negative imagery has been found to be detrimental to performance. The exercises below will look to develop your ability to manipulate the images that you create in the way that you want. It is important to be able to control the imagination of the golf strokes because if you imagine how to play a shot, that is not quite right, you may want to create a corrected image. It is important to imagine correct images because the incorrect imagination of a shot can lead you to perform the shot incorrectly.

Exercise 1

Imagine you are walking towards a ball that needs to be chipped onto the green from the fairway. I want you to imagine your preparatory stance for taking the chip shot. Now imagine executing the chip shot so that the ball travels high up into the air and then lands sharply to the right of the hole in front of you. I now want you to imagine taking the shot again but this time imagine hitting the shot to the left of the hole, imagine the different stance and also how the ball travels through the air and then bounces a few times as it lands on the ground.

Exercise 2

Imagine that you are walking towards a long putt. I want you to imagine taking the putt shot, imagine the ball rolling and jumping in places straight over the green and into the hole. Now imagine taking the shot again, this time imagine taking the putt and watch it roll across the grass and begin to slow before it reaches the hole. The ball ends up stopping 20 inches from the hole directly in front of you.

Exercise 3

Imagine standing next to the tee. You look down the fairway and see a stream running across the centre of it. I want you to imagine walking to up to the tee and with your driver and ball in your hand. Place the ball on the tee and now prepare to take the shot. Take a few practice swings and then hit the ball. Imagine the ball flying through the air, swerving slightly as the wind catches it. The ball lands on the fairway in front of the stream. It bounces 4 times, rolls for about 10 yards and then comes to a halt 10 yards in front of the stream. Now imagine being back on the tee and taking the shot again. This time however you drive the ball much more aggressively. As you hit the ball you hear the sound of the club making clean contact with the ball and see it flying through the air. It is moving much further and faster than the previous shot and is now flying over the stream. The ball bounces on the fairway over the other side of the stream. It bounces three times and rolls to a halt after 5 yards in the centre of the fairway.

A different vividness and controllability exercise should be practiced three times a week. The exercises can be found on the disk provided. The first three exercises on the disks are vividness exercises and the last three are controllability exercises. This disc can be played on a standard CD player.

Stressful golf strokes

Golf is an inherently stressful sport. Throughout competition you will be presented with lots of strokes/ shots that you find particularly stressful. Stressful strokes/shots are those that place you under a bit of additional pressure. For example you may feel more pressure/stress when you are presented with a difficult shot e.g. you have hazard in front of you. You may also feel additional pressure/stress when you are putting for a birdie or have made a mistake on a previous shot. Are there any golf strokes/shots that you consistently find stressful?

....
....
....
....

The strokes/ shots that you find stressful can change over time and may change from hole to hole.

Use during competition

Although practicing the use of imagery at home will enhance your ability to create vivid images and control them, the purpose of this intervention is to provide you with skills to use during competition when you are challenged with a variety of different stressful golf strokes/shots. In particular we are looking to provide you with the imagery skills to enable you to clearly and successfully plan how you are going to play stressful golf strokes/shots. The examples below detail how imagery can be used when golfers are presented with stressful golf strokes.

Example: A golfer is presented with a stressful shot. He mishit the ball from the tee, missed the fairway and the ball has end up stuck behind a tree. The golfer is feeling stressed because a) he has played a bad previous shot and b) he is now presented with a shot that he finds difficult as there is a hazard directly in front of him. As the golfer is walking towards the ball that he can see lying behind the tree (about 30 or 40 yards away) he starts to imagine how he can successfully play his way out of this situation weighing up a few different options. He firstly imagines playing an aggressive iron shot from behind the tree playing the ball to the right of the tree. He imagines taking the shot and then how the ball will react in the prevailing conditions (how it travels through the air, and reacts on the ground when it hits the fairway). When he imagines this image he notices that the gentle slope on the fairway to the right will mean that the ball will roll right to the side of the fairway. He now imagines a taking a different shot. This time he imagines playing a more delicate shot to the left of the tree. He imagines taking the shot and then focuses on how the ball will react in the air and then on the ground. He imagines the ball travelling high into the air and then bouncing twice in the middle of the middle of the fairway and then stopping. The golfer is happier with the second imagined shot and the way that it reacted and the position it ended up in and as such decides to play this shot physically. The golfer was able to vividly, and in a controlled manner, plan his shot so that he then had a clear idea about what he was physically going to do. He used a few different images of playing different shots to weigh up the best option for playing the shot.

Example: A golfer is presented with a stressful putt. He has bogeyed his previous hole and is now putting for a birdie. The ball is 6 feet away from the hole. There is slight upward slope to the hole. As the golfer is walking towards the ball (about 30 yards away) he starts to imagine his plan of how to play the putt. He vividly, and in a controlled manner, imagines executing the putt and then really imagines the ball rolling up the green and how it reacts to the surface. He then imagines the slowing of the ball as it reaches the hole up the slope and drops into it. The golfer is happy with this image of the putt as it has the planned outcome that he wished for. As such once he approaches the shot he physically performs that shot that he just imagined and the ball goes into the hole.

The examples above detail how imagery can be used to plan stokes/shots that are perceived to be stressful. From now on when you are competing I want you to always imagine your plan of how to play stressful golf strokes. Once you can see the ball as you are walking towards it **(approximately 30 – 40 yards away from it)** I want you to imagine executing golf stroke/shot that will best help you overcome the situation. I want you to imagine playing the shot and then really focus on how the ball will react in the prevailing conditions (how it will travel across the ground, fly through air, land etc) rather than the intricate mechanisms of the swing.

The images that you create should be imagined in real time rather than slow motion to allow you to have a clearer picture about how the ball will react. You should try to create vivid images and control the image so that you can come to a positive outcome. The exercises that you have practiced at home should make it easier for you to create these vivid and controlled images.

'Staying in the moment' is very important in golf and as such you should focus on the stroke/shot and not leap ahead to the next shot or hole. Just think about the playing the shot that you want to.

Remember when you are presented with a stressful stroke/shot you may need to imagine a few different stoke/shot options to enable you to select the best shot option for you. Once you get to ball you should have come to a clear conclusion about how you plan to play the golf stroke. All that should be left to do is replay that shot physically.

Things to remember

Practice at home

- Practice a different vividness and controllability exercise 3 times a week (the disk attached will guide you through the scripts) to ensure that you are able to create clear images that you can control and manipulate. These exercises should be practiced at home. The use of the exercises at home will mean that you are better able to create vivid and clear images when you are on the course.

Competition

- When competing assess the strokes/shots that you are presented with and determine whether you find them stressful or not.
- If you perceive a shot to be stressful use the period of time where you are walking towards the ball (30 or 40 yards away) to 'stay in the moment' and to plan how you wish to play the shot. Remember to:-
  - Imagine executing the stroke/shot and really focus on how it reacts in the prevailing conditions and where it will end up on the course. Remember you may need to imagine a few different strokes/shots to ensure that you have 'seen' the best plan of how to physically play the shot.
  - Always create vivid images of these strokes/shots, considering all of the extraneous variables e.g. weather, surface, slopes etc.
  - Ensure that your images are positively framed and that they are controlled and not widely unrealistic or negative.
- Once you get to the ball you should have a clear idea of how you plan to play that shot and then you should try and follow that strategy of play physically.

Self-talk

Self-talk

Self-talk is basically what people say to themselves. It can either be said out loud or people can talk to themselves in their head so that no one can hear them. Self-talk is a very popular psychological strategy and is believed to be very good for controlling thoughts and enhancing performance. Many elite athletes and coaches advocate the use of self-talk.

When Jack Nicklaus reflected on his mental abilities as a teenage golfer he highlighted the importance of self-talk when he stated

"Good with the muscles but still wobbly with the mind. I could hit it fine most of the time but I still couldn't think well enough often enough for long enough."

In addition to this research has revealed that self-talk can enhance performance across a variety of different sports including golf. Relatively recent studies have found that the use of self-talk can improve putting performance and also the performance of stressful golf strokes.

Using self-talk to plan strokes/shots

Similarly to imagery different types of self-talk exist. The two types of self-talk that are most commonly used are cognitive and motivational.

Cognitive self-talk involves talking oneself through the production of skills or plans for playing golf strokes e.g. 60 yard drive, left of the fairway.

Motivational self-talk involves talking to oneself to optimise emotions e.g. geeing yourself up or calming yourself down.

You have been using imagery to plan the production of golf strokes that you find stressful. When planning how to play stressful strokes/shots self-talk can be used **immediately following the use of imagery**. The two sections below detail how self-talk can be used following the use of imagery.

Use self-talk to add clarity to the stroke/shot that you have imagined

We are going to use self-talk to support the imagery that you are using. When planning the production of stressful shots after you have imagined a shot use self-talk to add clarity to what you are doing.

Example: You are standing on the tee, there is a hazard to the right of fairway and you perceive this shot to be stressful. At this point you use your imagery and self-talk strategies to help you plan your way out of this stressful situation. Firstly you create a mental image of playing an aggressive drive to the left of the fairway. You vividly imagine how you will play the shot, the feel of the shot, how it will react in the prevailing conditions and where it will end up on the fairway. You are happy with this shot and decide that this is how you want to play the shot. At this point use self-talk reaffirm to yourself, and make it clearer, that your plan of action is to play a **'70 metre drive, left.'** By stating this to yourself you have now made a clear decision about what you are going to do. All that should be left to do is to physically execute the shot that you have imagined and told yourself to do.

Use self-talk to correct the stroke/shot that you have imagined

As we discussed in the previous session you may sometimes imagine a few different shot options for playing a stressful stroke/shot. At this stage you can use self-talk to correct some of the earlier strokes/shots that you may have imagined.

Example: You are presented with a stressful shot. You are stuck behind a tree as you have missed the fairway. You firstly vividly imagine playing an aggressive shot to the right of the tree. You imagine playing a low shot; you imagine how it will react in the prevailing conditions and where it will end up on the fairway. You 'see' that the ball will roll back into the rough to the right of the fairway when you imagine this shot. At this stage you use self-talk to correct the image and tell yourself to try and imagine a different shot **'chip, left.'** You then vividly imagine playing the chip shot to the left of the tree, you imagine it flying through the air and then landing in the centre of the fairway about 20 yards away from you. You are happier with this imagine. You then use your self-talk at this point to make your decision that you are going to play a **'20 yard chip, left.'**

Keep your self-talk short

From the examples provided you can see that the self-talk used is quite short; almost a phrase. Self-talk can take the form of sentences, cue words or phrases. Try to avoid your self-talk being too long as it can distract you and overload your thoughts. Instead try to use phrases or cue words to reaffirm and emphasis your imagined plan for playing the strokes or shots.

Practice: Imagine executing a bunker shot onto the green that is 25 yards away from you. You imagine playing your shot out of the bunker to the right as the fairway slopes to the left. Imagine taking the shot, the flight of the ball, its bounce and then how it rolls to the left slightly and onto the green. Use your self-talk at this stage to tell yourself your decision on how you plan to play the shot. What would you say to yourself? Think about the length of your self-talk.

Positively frame your self-talk

When using your self-talk try to ensure that it is positively framed. For example if you are playing a shot and there is a hazard in front of you instead of saying avoid the hazard tell yourself to hit the ball to either the left or right of it. Using negatively framed self-talk will draw your attention to what you are trying to avoid.

Avoid focussing on the intricate mechanisms of the golf stroke

You will notice from the examples provided that the self-talk used focuses on the type of shot to play and where it will end up. Avoid talking yourself through the intricate mechanisms of the golf stroke. Focussing on the intricate mechanisms of the golf stroke has been found to be detrimental to performance.

Things to remember

Practice at home

- Practice a different vividness and controllability exercise 3 times a week at home (the disk attached will guide you through the scripts) to ensure that you are able to create clear images that you can control and manipulate. Exercises 1 – 3 = vividness, Exercises 4 – 6 = controllability

Competition

- When competing assess the strokes/shots that you are presented with and determine whether you find them stressful or not.
- If you perceive a shot to be stressful use the period of time where you are walking towards the ball (30 or 40 yards away) to 'stay in the moment' and to plan how you wish to play the shot. Remember to:-
    - Imagine executing the stroke/shot and really focus on how it reacts in the prevailing conditions and where it will end up on the course. Once you have imagined a stroke/shot use your self-talk to either clarify what you intend to do or to tell yourself to create another image of a different stroke/shot type. If you then imagine playing a shot and are happier with then use your self-talk to clarify what you intend to do.
- When using imagery and self-talk remember:-
    - Always create vivid images of these strokes/shots, considering all of the extraneous variables e.g. weather, surface, slopes etc.
    - Ensure that your images are positively framed and that they are controlled and not widely unrealistic or negative.
    - Always ensure that your self-talk is short, not negative in any way and does not focus on the intricate mechanisms of the golf stroke.
- Once you get to the ball you should have a clear idea of how you plan to play that shot and then you should try and follow that strategy of play physically.

Imagery scripts (see CD for new recordings)

Vividness: Exercise 1

Imagine you are standing on the first tee. The wind is strong; you can feel it on your face and can see and hear the trees moving with it. You stand there for a few seconds and smell the freshly cut grass. Now imagine bending down and placing your ball on the tee. You stand up and now look down the fairway. The fairway is narrow and there are trees at both sides of it and a pond to the left about 75 metres down the fairway. You get into the stance to strike the ball aggressively slightly to the right of the fairway. You now take a few practice swings and feel the movement. You now imagine striking the ball, hear the sound of the club maing contact with the ball and the watch as the ball flies through the air. It is swerving to the right with the wind. It begins its decent down towards to the ground and bounces three times before rolling for 5 yards and comes to halt 80 yards down the fairway approximately 10 yards to the right of the bunker.

Vividness: Exercise 2

Imagine you are walking towards your ball that is positioned behind a tree to the left of the fairway. You can hear a few small leaves and branches snap and crackle as you walk towards it. You can hear the leaves blowing in the wind above you. You imagine looking at the ball; it is positioned right behind the tree. Now imagine holding your iron; feel the rubber grip in your hands. You decide that you would like to play an aggressive iron shot to the left of the tree. You take a few practice swings and then get in the stance for executing the shot. Imagine taking an aggressive shot to the right of the tree, imagine the ball flying low through the air, travelling 50 yards before it drops to the left of the fairway where it bounces twice rolls and comes to a halt.

Vividness: Exercise 3

You are walking towards your ball lying on the fairway. You have just played the tee shot and are about 20 yards away from the ball. Your ball is bright white on the bright green grass. It is a hot and bright day. You can feel the warmth on your skin and the smell of suntan lotion. You can hear your clubs rattling in your kit back and hear your fellow golfers chatting. You approach your shot. You select an iron to play the ball further down the fairway. You look down the fairway; it is narrow and the green is approximately 70 yards away from you. You take a few practice swings and prepare to play an aggressive shot down the centre of the fairway. Now imagine playing the shot, imagine the feel of the swing and feel the club connect with the ball. You watch the ball travel through the air, it starts its decent, lands on the green, bounces three times and rolls where it stops 10 metres away from the hole.

Controllability: Exercise 1

Imagine you are preparing to take an iron shot from the right side of the fairway. You are standing over the ball with your iron in your hand. Feel the rubber grip. The ball is positioned 70 metres away from the green. You look towards the green and get into the position to strike the ball. You take a few practice swings. Now imagine playing a low driving shot, feel the fast movement of the ball and watch as it travels low through the air. Watch as it quickly hits the ground and skids across the green landing 10 feet away from the hole.

Now imagine preparing to take the iron shot again from the right side of the fairway. You are standing over the ball with your iron in your hand. Feel the rubber grip. The ball is positioned 70 metres away from the green. You look towards the green and get into the position to strike the ball. You take a few practice swings. Now imagine playing a loftier shot, watch as the ball lifts high up into the air and is caught slightly by the wind. Watch as it starts to descend towards the ground and see how it bounces on the green, rolls and comes to a halt 10 feet away from the hole.

Controllability: Exercise 2

Imagine you are preparing to take the first tee shot. You are standing over the ball with your driver in your hand. Feel the rubber grip of the club and feel the heat baring down on your skin. It is a hot, calm day. It is silent except from the chatter of other golfers by the clubhouse. You look down the long wide fairway. Imagine playing an 80 metre drive down the fairway. Imagine the feeling of the swing and the sound of the golf club making contact with the ball as you execute the shot. The ball travels high through the air. It travels straight down the fairway and bounces twice on the ground 80 metres down the fairway and rolls for a few metres before stopping.

Now imagine taking the same tee shot again. However this time imagine that is a much windier day. There is strong breeze travelling from the right of the fairway. You are standing over the ball with your driver in your hand. Feel the rubber grip of the club and feel the breeze on your skin and see and hear the trees blowing in the wind. You look down the long wide fairway. Imagine playing an 80 metre drive down the fairway. Imagine the feeling of the swing and the sound of the golf club making contact with the ball as you execute the shot. The ball travels high through the air. This time the wind coming from the right catches the ball as it is travelling through the air which steers the ball to left slightly and slows the progress of the ball through the air. The ball lands on the green about 70 metres down the fairway, bounces 4 times and then comes to a halt.

Controllability: Exercise 3

Imagine you are 20 yards away from the green. There is a gentle slope to the left of the green. Imagine removing your wedge from your golf bag and getting into the preparatory position for executing a chip shot onto the green. Take a few practice swings. Feel the movement of the chip shot. Now execute the shot, hear the sounds of the club making contact with the ball and watch as the ball travels high through the air and then lands to the front of the green and rolls down the slope to left.

Now imagine taking the chip shot again. This time however imagine getting into a preparatory stance that will allow you to play the shot further to the right of the green to take into account the gentle left facing slope. Imagine taking this chip shot; imagine your stance, the feel of the shot and how the ball travels through the air. The ball lands much further to the right of the green this time and rolls to the left; however it stops rolling in front of the hole rather than right to the left of the green.